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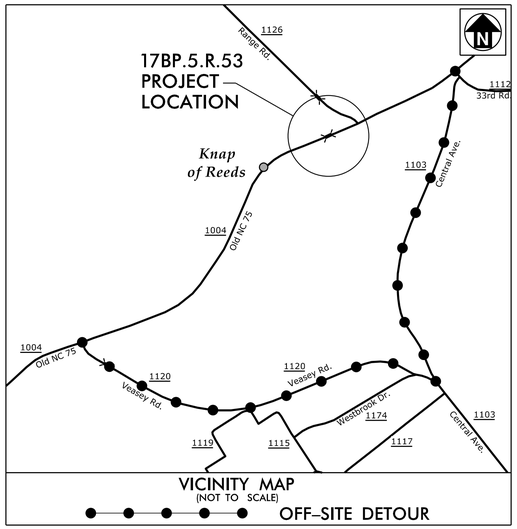
TIP PROJECT: 17BP.5.R.53

CONTRACT:



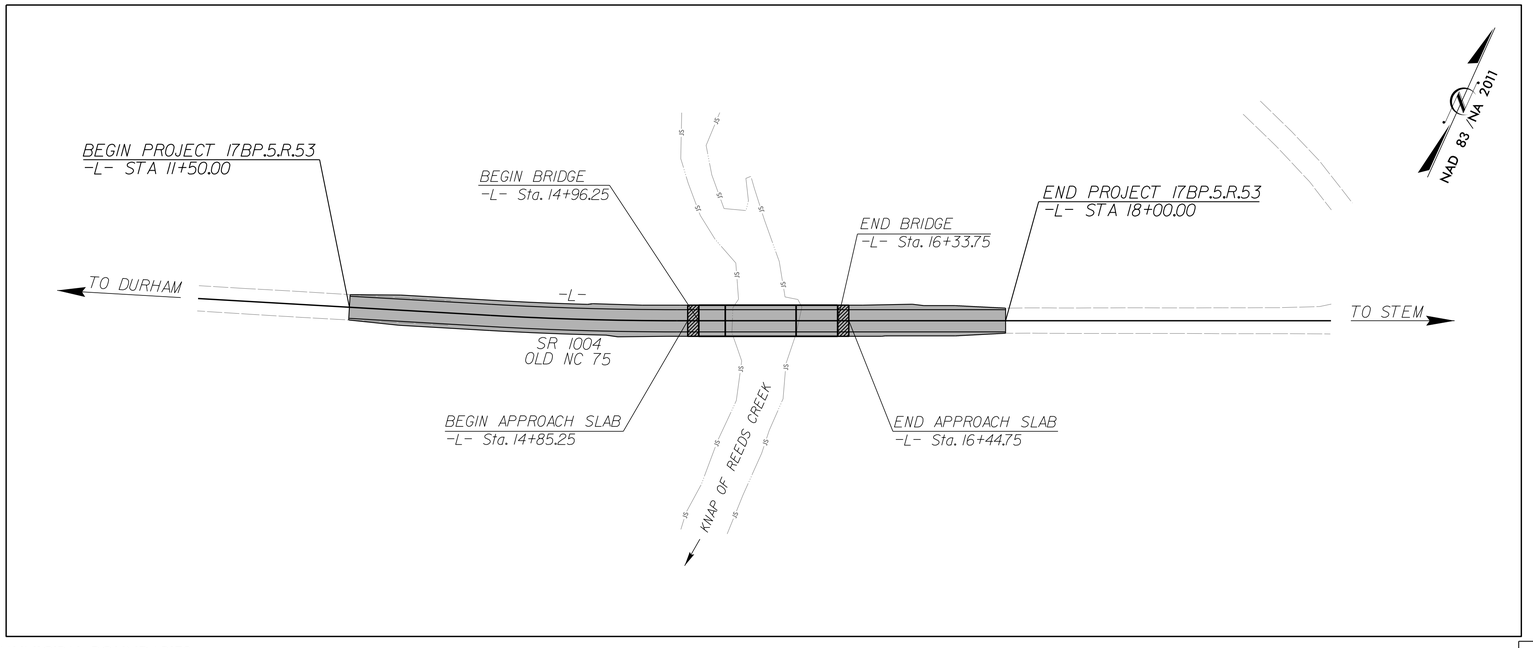
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
GRANVILLE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.5.R.53	1	

STATE PROJECT NO.	F.A. PROJ. NO.	DESCRIPTION
17BP.5.R.53		

LOCATION: BRIDGE NO. 62 OVER KNAP OF REEDS CREEK ON SR 1004 (OLD NC 75)

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY III.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT (2011) = 3700

ADT (2025) = 12400

V = 55 MPH

CLASS =
MAJOR COLLECTOR
SUB REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT = 0.097 MILES

LENGTH STRUCTURE TIP PROJECT = 0.026 MILES

TOTAL LENGTH TIP PROJECT = 0.123 MILES

Prepared in the Office of Hatch Mott MacDonald for

DIVISION 5

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
AUGUST 11, 2015

LETTING DATE:

TIM JORDAN, PE
PROJECT ENGINEER

TRENT CORMIER, PE
HYDRAULICS ENGINEER

NCDOT CONTACT: LISA GILCHRIST, EI

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER TIMOTHY JORDAN

DocuSigned by: James Timothy Jordan 0BE86A54147340...

5/18/2016
P.E.
SIGNATURE:

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 34364 ENGINEER TRENTON J. CORMIER

DocuSigned by: Trenton Cormier FA65D1EB523C0437...

5/18/2016
P.E.
SIGNATURE:

PLANS PREPARED BY:

Hatch Mott MacDonald
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
(919) 552-2254 (Fax)
www.hatchmott.com
LICENSE NO. F-0669

ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: P-0258

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Jor66165

PROJECT REFERENCE	SHEET NO.
17BP.5.R.53 – GRANVILLE 62	1A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER TIMOTHY JONES

DocuSigned by: Timothy Jones 5/18/2016

HATCH MOTT MACDONALD I & E, LLC
LICENSE NO. F-0669

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Prepared in the Office of: Hatch Mott MacDonald PO Box 700 Fuquay-Varina, NC 27526 www.hatchmott.com

GENERAL NOTES

GENERAL NOTES: 2012 SPECIFICATIONS

EFFECTIVE: 01–17–12
REVISED: 10–31–14

GRADING AND SURFACING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE–IN.

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

END BENTS:

THE SURVEYOR SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS–SECTIONS PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE DUKE ENERGY, FRONTIER COMMUNICATIONS AND SOUTH GRANVILLE WATER & SEWER AUTHORITY.

RIGHT–OF–WAY MARKERS:

ALL RIGHT–OF–WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY CONTRACT.

LIST OF ROADWAY STANDARD DRAWINGS

EFF. 01–17–2012
REV. 02–29–2016

2012 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch – N. C. Department of Transportation – Raleigh, N. C., Dated January, 2012 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
	DIVISION 2 – EARTHWORK
200.03	Method of Clearing – Method III
225.02	Guide for Grading Subgrade – Secondary and Local
225.04	Method of Obtaining Superelevation – Two Lane Pavement
	DIVISION 3 – PIPE CULVERTS
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
	DIVISION 4 – MAJOR STRUCTURES
422.10	Reinforced Bridge Approach Fills
	DIVISION 5 – SUBGRADE, BASES AND SHOULDERS
560.01	Method of Shoulder Construction – High Side of Superelevated Curve – Method I
	DIVISION 8 – INCIDENTALS
806.01	Concrete Right–of–way Marker
840.00	Concrete Base Pad for Drainage Structures
840.25	Anchorage for Frames – Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet – for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

INDEX OF SHEETS

PROJECT REFERENCE	SHEET NO.
17BP.5.R.53 – GRANVILLE 62	1B

Note: Not to Scale

****S.U.E. = Subsurface Utility Engineering***

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- H–Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth — T
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

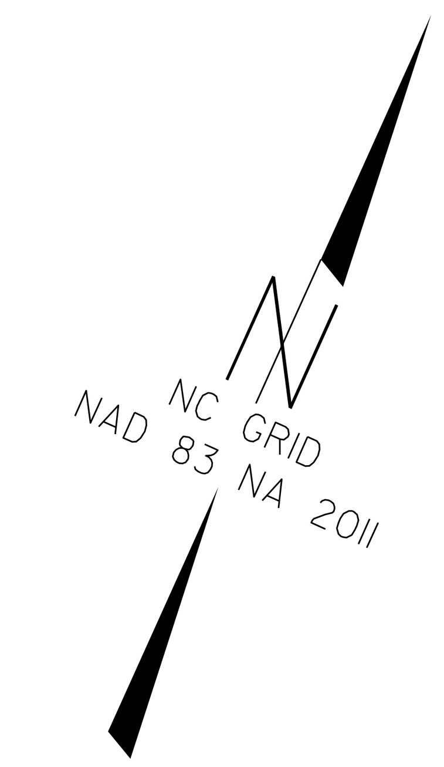
MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

04/01/16

PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.53 – GRANVILLE 62	1C–1
LOCATION & SURVEYS	

SURVEY CONTROL SHEET 38–0062

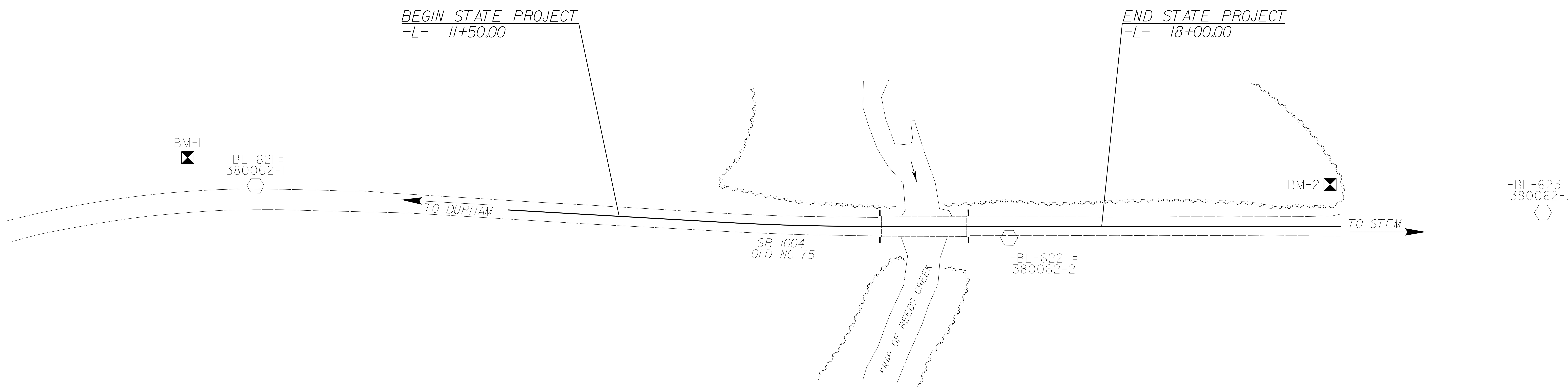


ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	11+50.00	30.09	875474.4555	2066458.0585
L	11+50.00	55.00	875451.1958	2066466.9859
L	11+50.00	-29.91	875530.4713	2066436.5588
L	11+50.00	-55.00	875553.8913	2066427.5699
L	12+89.80	-55.00	875603.9843	2066558.0833
L	12+89.80	55.00	875501.2888	2066597.4993
L	14+30.00	-55.00	875656.1558	2066685.6149
L	14+30.00	-65.00	875665.3264	2066681.6274
L	14+74.58	-65.00	875683.0191	2066721.5574
L	14+74.58	-55.00	875673.9048	2066725.6718
L	14+74.58	55.00	875573.6471	2066770.9309
L	18+00.00	-55.00	875807.7992	2067022.2741
L	18+00.00	55.00	875707.5408	2067067.5317
L	18+00.00	29.82	875730.4914	2067057.1716
L	18+00.00	-30.18	875785.1779	2067032.4856

L

TYPE	STATION	NORTH	EAST
POT	10+00.00	875448.7944	2066307.2385
PC	12+89.80	875552.6365	2066577.7913
PT	14+74.58	875623.7759	2066748.3014
POT	21+22.05	875890.1745	2067338.4263



BASELINE

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
621	380062-1	875338.586	2065984.042	294.70	OUTSIDE PROJECT LIMITS	
622	380062-2	875692.151	2066937.644	285.41	16+75.28	15.58 RT
623	380062-3	876063.121	2067895.278	290.80	OUTSIDE PROJECT LIMITS	

BENCH MARK DATA

****

BM-1 ELEVATION = 301.49'
N 875335 E 2065885
L STATION 10+00.00
S 74°57'58.53" W DIST 436.80'
RR SPIKE IN 50" OAK

****

BM-2 ELEVATION = 281.73'
N 875935 E 2067302
L STATION 21+07.00 56' LT
RR SPIKE IN 30" PINE

****

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "38-0062-3"
WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF NORTHING: 876063.121(ft) EASTING: 2067895.278(ft)
ELEVATION: 290.80(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99998806
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "38-0062-3" TO -L- STATION 11+50.00 IS
S 68°50'12" W 1552.72'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

GEOID G12NC
NOTE: DRAWING NOT TO SCALE

NOTES:

SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

⬡ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

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PROJECT REFERENCE	SHEET NO.
17BP.5.R.53 – GRANVILLE 62	2A–1

ROADWAY DESIGN ENGINEER

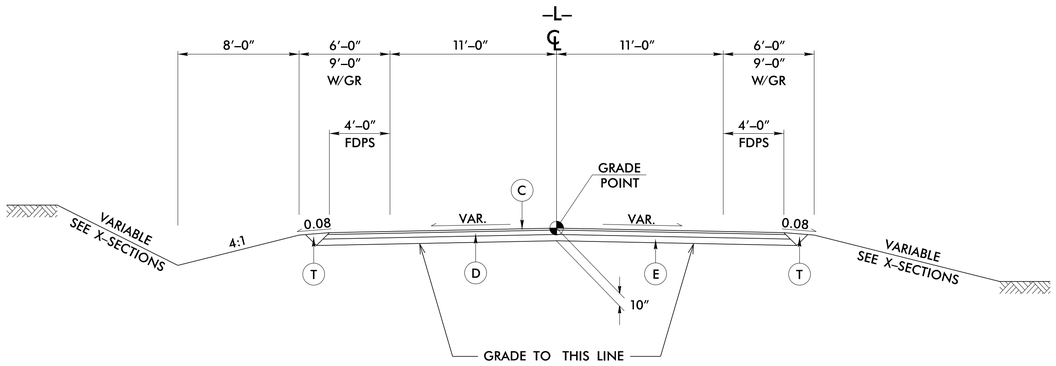
NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER TIMOTHY JONES

DocuSigned by: Timothy Jones 5/18/2016

HATCH MOTT MACDONALD I & E, LLC
LICENSE NO. F-0669

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of: Hatch Mott MacDonald PO Box 700 Fuquay-Varina, NC 27526 www.hatchmott.com

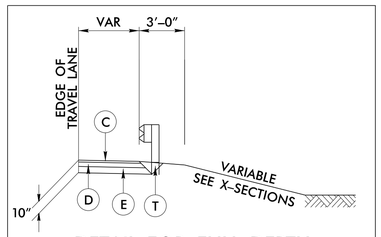


TYPICAL SECTION NO. 1

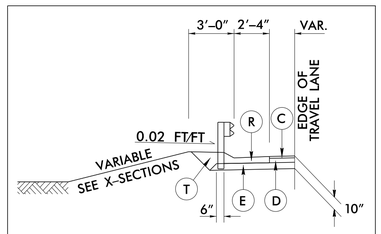
TRANSITION FROM EXISTING TO TYPICAL SECTION NO. 1:
–L– STA 11+50.00 TO 12+00.00

USE TYPICAL SECTION NO. 1:
–L– STA 12+00.00 TO 14+96.25 (BEGIN BRIDGE)
–L– STA 16+33.75 (END BRIDGE) TO 17+50.00

TRANSITION FROM TYPICAL SECTION NO. 1 TO EXISTING:
–L– STA 17+50.00 TO 18+00.00

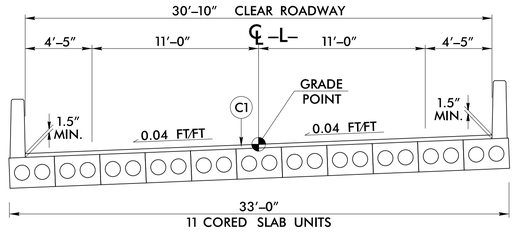


DETAIL FOR FULL DEPTH PAVED SHOULDER IN CONJUNCTION WITH GUARDRAIL



DETAIL FOR SHOULDER BERM GUTTER IN CONJUNCTION WITH GUARDRAIL

–L– STA 14+46.00 TO 14+85.25 LT



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2:
–L– STA 14+96.25 (BEGIN BRIDGE) TO 16+33.75 (END BRIDGE)

NOTE: SEE STRUCTURE PLANS FOR PAVEMENT DEPTHS ON STRUCTURE

PAVEMENT SCHEDULE

C	PROP. APPROX. 1½″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C1	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT GREATER THAN 2″ IN DEPTH.
D	PROP. APPROX. 3½″ ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 399 LBS. PER SQ. YD.
E	PROP. APPROX. 5″ ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
R	SHOULDER BERM GUTTER.
T	EARTH MATERIAL.

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

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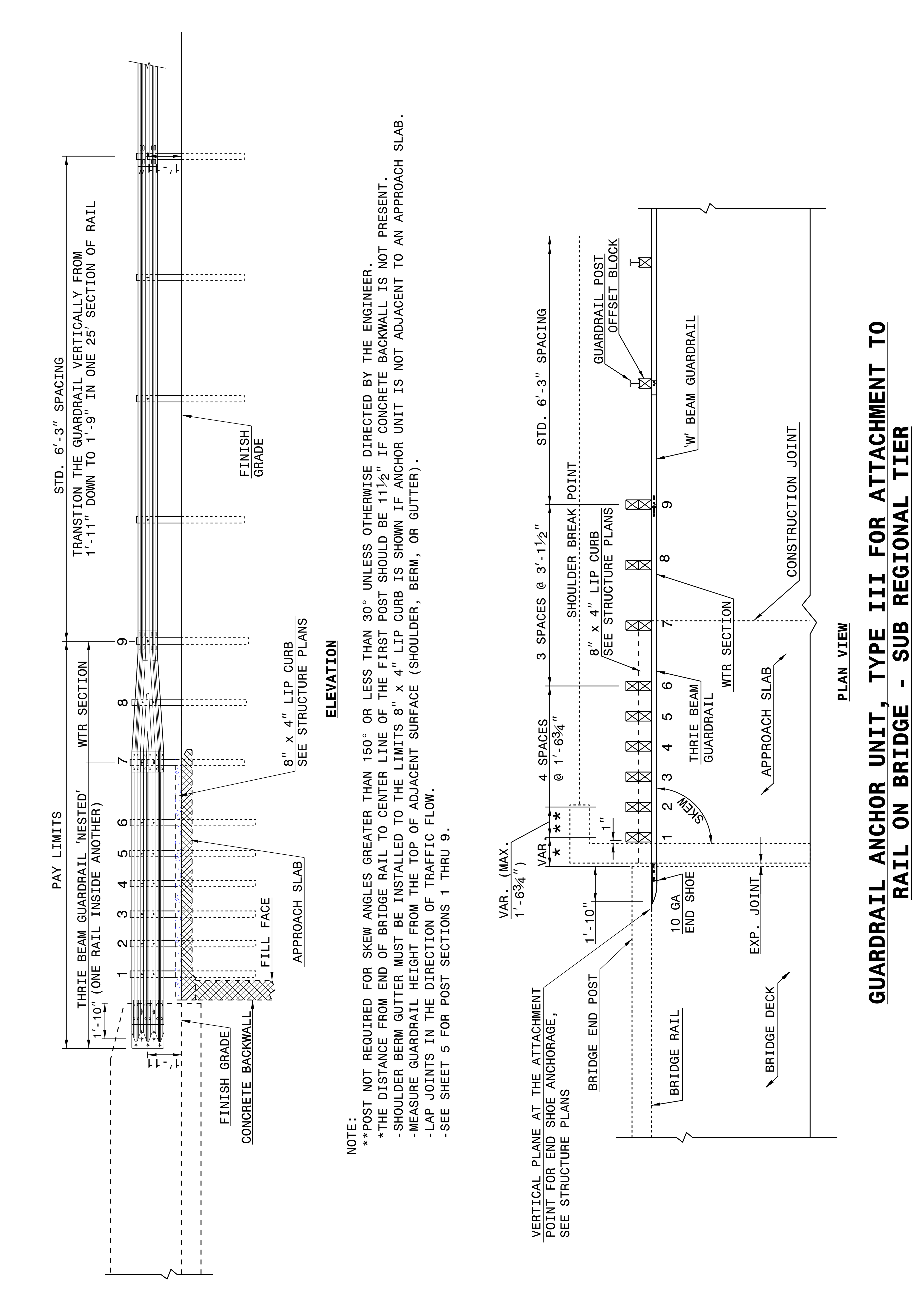
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
ENGLISH DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER
SHEET 2 OF 7 862d03

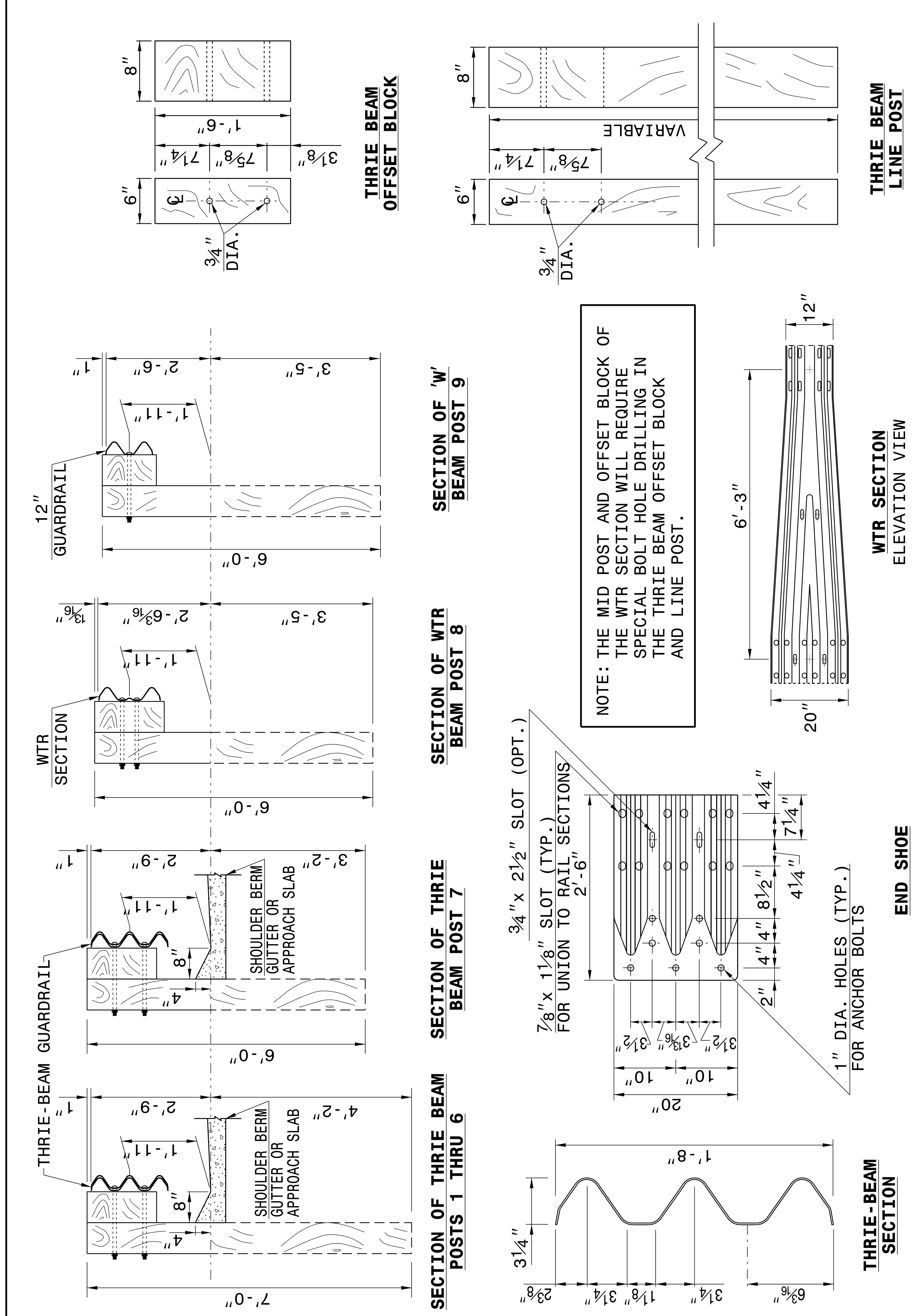


STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7
862d03

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
ENGLISH DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS GUARDRAIL ANCHOR UNIT, TYPE III
SHEET 3 OF 7 862d03



STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III

SHEET 3 OF 7
862d03

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

ORIGINAL BY: J HOWERTON DATE: 06-22-12
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON–GATING IMPACT ATTENUATOR TYPE 350

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS								IMPACT ATTENUATOR TYPE 350			REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	AT–1	GRAU 350	TYPE III						NO.	PERMITTED G	PERMITTED NG	
–L–	14+15.00	14+96.25	RT	81.25′			14+50.00	14+96.25	6′	9′	50′		1′			1	1									
–L–	13+90.00	14+96.25	LT	106.25′			14+96.25	14+00.00	6′	9′		50′		1′		1	1									EXTENDED TO KEEP GRAU–350 OUT OF SBG
–L–	16+33.75	16+91.37	RT	50.00′	12.50′		16+33.75	16+50.00	6′	9′					1		1									BREAK FOR DRIVE
–L–	16+33.75	17+15.00	LT	81.25′			17+00.00	16+33.75	6′	9′	50′		1′			1	1									
		SUBTOTAL		318.75′	12.50′																					
		LESS ANCHOR DEDUCTIONS																								
		GRAU–350 3 x 50.00′ =		–150.00′																						
		AT–1 1 x 6.25′ =		–6.25′																						
		TYPE III 4 x 18.75′ =		–75.00′																						
		TOTAL		87.50′	12.50′										1	3	4									

SHOULDER BERM GUTTER SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LENGTH
–L– LT	14+46.00	14+85.25	39.25′
		TOTAL	39.25′
		SAY	45.00′

SUMMARY OF EARTHWORK
IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
–L– 11+50.00 TO 14+96.25 (BEGIN BRIDGE)	486		904	418	
–L– 16+33.75 (END BRIDGE) TO 18+00.00	196		360	164	
SUBTOTAL	682		1264	582	
WASTE IN LIEU OF BORROW					
PROJECT TOTAL	682		1264	582	
5% TO REPLACE BORROW				30	
GRAND TOTAL	682		1264	612	
SAY	720			650	

NOTE: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Fine Grading, Clearing and Grubbing and Removal of Existing Asphalt Pavement will be paid for at the contract Lump Sum price for "Grading".

PROJECT REFERENCE	SHEET NO.
17BP.5.R.53 – GRANVILLE 62	3D–1

SUB–REGIONAL & REGIONAL
LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) SIZE 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE PVC	DO NOT USE CAAP	DO NOT USE HDPE
								THICKNESS OR GAUGE											
14+53 +/–	LT	401	402	284.6	281.3	277.1			20′								X	X	X
17+00 +/–	RT	403							28′								X	X	X
TOTAL									48′										

C.S. PIPE SIZE 12"	15"	18"	24"	36"	42"	48"	R.C. PIPE (CLASS III) 15"	18"	24"	30"	36"	42"	48"	R.C. PIPE (CLASS IV) 12"	15"	18"	24"	30"	36"	42"	48"
THICKNESS OR GAUGE .064	.064	.064	.064	.079	.109	.109															

*** R. C. PIPE (CLASS V)	*** R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	*** R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES * TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL. 'B') LIN. *FT. PER EACH (0' THRU 5.0')	5.0' THRU 10.0' A	10.0' AND ABOVE B	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION CATCH BASIN	DROP INLET
							1										
							1										

G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	T.B.D.I. STD. 840.35	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
				1	1				28′	
				1	1				28′	

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I. (N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

NOTE: Invert Elevations are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300–5".

PROJECT REFERENCE	SHEET NO.
17BP.5.R.53 – GRANVILLE 62	4

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 21102 JAMES TIMOTHY JORDAN 5/18/2016	NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 34364 TRAVION J. CORMIER 5/18/2016
HATCH MOTT MACDONALD I & E, LLC LICENSE NO. F-0669	ICA ENGINEERING LICENSE NO. F-0258

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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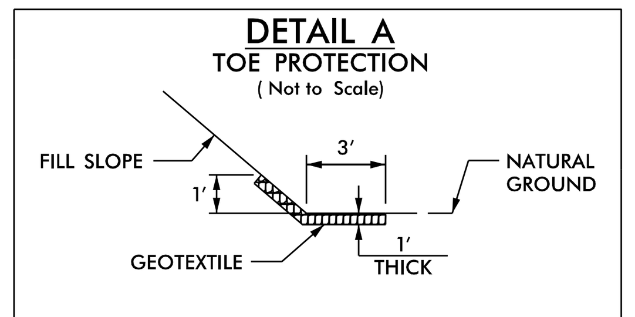
ICA Engineering 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No: F-0258

HORIZONTAL SCALE 25' 0 25' 50'

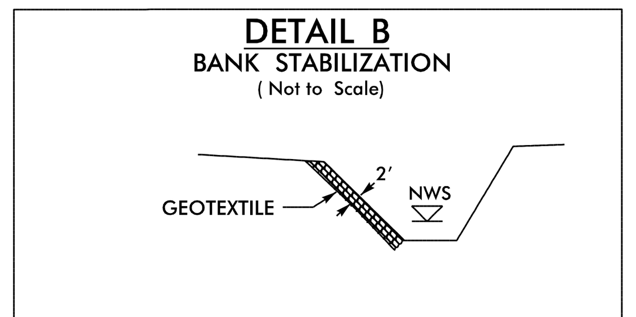
DETAIL A
TOE PROTECTION
(Not to Scale)



Type of Liner = CLASS B RIP RAP

–L– STA. 16+45 TO STA. 16+95 RT

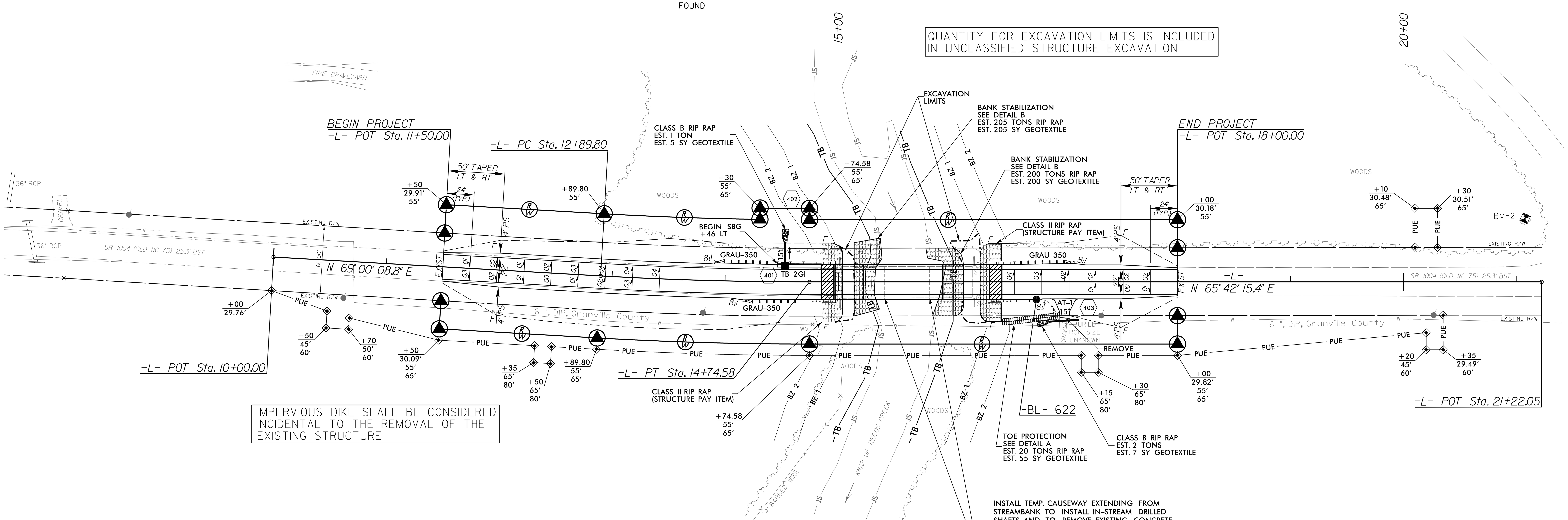
DETAIL B
BANK STABILIZATION
(Not to Scale)



Type of Liner = CLASS II RIP RAP

–L– STA. 15+14 TO STA. 15+39
–L– STA. 15+77 TO STA. 16+11

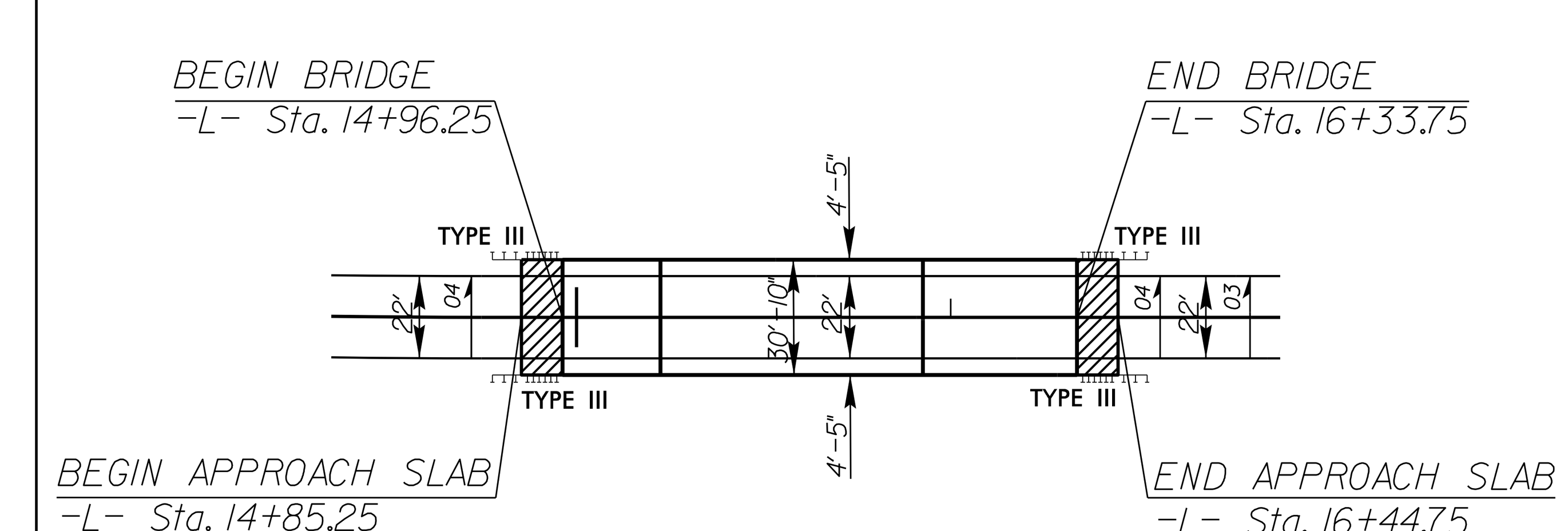
NAD 83/NA 2011



INSTALL TEMP. CAUSEWAY EXTENDING FROM STREAMBANK TO INSTALL IN-STREAM DRILLED SHAFTS AND TO REMOVE EXISTING CONCRETE PIERS. REMOVE ALL PORTIONS OF CONCRETE APRON, CONCRETE PIERS, AND REMANANT INTERIOR BENTS. USE NCDOT STANDARD BMP (INCIDENTAL TO STRUCTURE REMOVAL) TO DEWATER AND ISOLATE WORK AREA TO REMOVE PIERS AND INSTALL SHAFTS AND STABILIZE STREAMBANK. ONLY ONE CAUSEWAY MAY BE INSTALLED IN THE STREAM AT ANY ONE TIME. REMOVE ALL PORTIONS OF TEMPORARY CAUSEWAY AND INSTALL CLASS II RIP RAP BANK STABILIZATION AND EXTEND RIP RAP TO AREA SHOWN.

2
STATE OF NORTH CAROLINA
NO DEED REFERENCE
FOUND

–L–
PI Sta 13+82.21
Δ = 3° 17' 53.4" (LT)
D = 1° 47' 05.7"
L = 184.78'
T = 92.42'
R = 3,210.00'



SKETCH SHOWING RELATIONSHIP OF BRIDGE TO PAVEMENT

FOR STRUCTURE PLANS SEE SHEETS S-1 THRU S-21

PROJECT REFERENCE	SHEET NO.
17BP.5.R.53 – GRANVILLE 62	5

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JORDAN

DocuSigned by: JAMES TIMOTHY JORDAN

5/18/2016

HATCH MOTT MACDONALD I & E, LLC
LICENSE NO. F-0669

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 34364 ENGINEER BENJAMIN J CORMIER

DocuSigned by: BENJAMIN J CORMIER

5/18/2016

ICA ENGINEERING
LICENSE NO. F-0258

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ICA Engineering, 5121 Kingsdom Way, Suite 100, Raleigh, NC 27607, NC License No: P-0258

VERTICAL SCALE 5′ 0 5′ 10′

HORIZONTAL SCALE 25′ 0 25′ 50′

-L-

BEGIN GRADE
STA. 11+50.00
EL = 286.43′

PI = 14+20.00
EL = 285.04′
VC = 120′
K = 147
DS = 60 MPH

END GRADE
STA. 18+00.00
EL = 286.18′

BRIDGE ℄ STA. 15+65 –L–
3 SPANS 24" PCCS: 1 @ 25′, 1 @ 70′, 1 @ 40′; OAL=135′
w/4′ DEEP CAPS, SKEW 90
GP ELEV. = 285.47′

OVERTOPPING AT ROADWAY SAG
STA. 14+36
ELEV. = 285.2′

REMOVE EXISTING BRIDGE

(–)0.5148%

(+)0.3000%

ELEV. = 277.1′

3.5′ KEY DEPTH (TYP.)

CLASS II RIP RAP SLOPE 1.5:1 (2 FT. THICK) (NORMAL TO CAP) (TYP.) (STRUCTURE PAY ITEM)

ELEV. = 277.0′

BANK STABILIZATION w/CLASS II RIP RAP

NORMAL WS
ELEV. = 270.3′
DATE: 4-9-2014

UNCLASSIFIED STRUCTURE EXCAVATION = 380 CY

BM #1 ELEVATION = 301.49′
RR SPIKE IN 50 INCH OAK
L STATION 10+00.00
S 74°57′ 58.53" W DIST 436.80′
(SEE SHEET 1C–1)

BM #2 ELEVATION = 281.73′
RR SPIKE IN 30 INCH PINE
L STATION 21+07.00 56′ LT
(SEE SHEET 1C–1)

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 4200	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 282.3	FT
BASE DISCHARGE	= 6320	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 284.25	FT
OVERTOPPING DISCHARGE	= 7550	CFS
OVERTOPPING FREQUENCY	= 500–	YRS
OVERTOPPING ELEVATION	= 285.2	FT
DATE OF SURVEY	= 4-9-2014	
W.S. ELEVATION AT DATE OF SURVEY	= 270.3	FT

310 300 290 280 270 260 250 240 230 220 210 200 190

10 11 12 13 14 15 16 17 18 19 20 21

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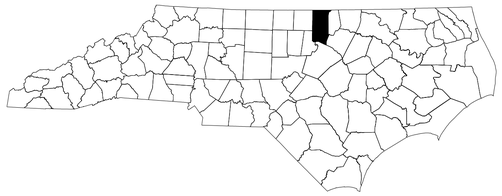
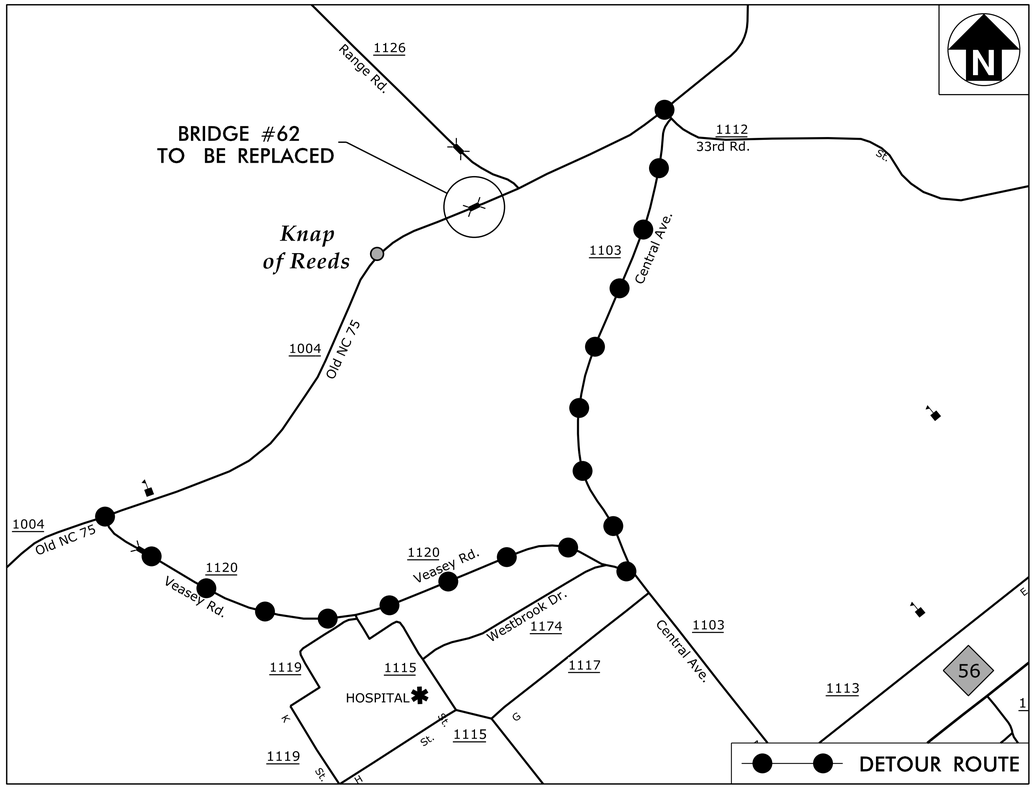
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

GRANVILLE COUNTY

BRIDGE NO. 62 OVER KNAP OF REEDS CREEK ON SR 1004 (OLD NC 75)





WORK ZONE SAFETY & MOBILITY
"from the MOUNTAINS to the COAST"

PREPARED IN THE OFFICE OF HATCH MOTT MACDONALD FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

TIM JORDAN, PE — *TRAFFIC CONTROL PROJECT ENGINEER*

BRIAN PHILLIPS — *TRAFFIC CONTROL DESIGN ENGINEER*

DIVISION OF HIGHWAYS * STATE OF NORTH CAROLINA * DEPARTMENT OF TRANSPORTATION * WORK ZONE TRAFFIC CONTROL

INDEX OF SHEETS

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(919) 552-2254 (Fax)
www.hatchmott.com

LICENSE NO. F-0669

DocuSigned by: James Timothy Jordan 08E66A5414734D1...

APPROVED:
DATE: 5/18/2016

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JORDAN

17BP.5.R.53

TIP PROJECT:

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PROJECT REFERENCE NUMBER	SHEET NO.
17BP.5.R.53 GRANVILLE 62	TMP-2

TRAFFIC MANAGEMENT PLAN

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

LANE AND SHOULDER CLOSURE REQUIREMENTS

A) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN 15 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN SHOULDER USING ROADWAY STANDARD DRAWING NO. 1101.04 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL OR A LANE CLOSURE IS INSTALLED.

TRAFFIC PATTERN ALTERATIONS

B) NOTIFY THE ENGINEER AND LOCAL SCHOOLS & EMS THIRTY (30) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

C) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

D) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.

COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

E) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

TRAFFIC CONTROL DEVICES

F) PLACE TYPE III BARRICADES, WITH "ROAD CLOSED" SIGN R11-2 ATTACHED, OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.

PAVEMENT MARKINGS AND MARKERS

G) INSTALL PAVEMENT MARKINGS AND MARKERS ON THE FINAL SURFACE ACCORDING TO THE ROADWAY STANDARD DRAWINGS.

H) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

MISCELLANEOUS

I) MAINTAIN ACCESS TO ALL RESIDENCES AND BUSINESSES BETWEEN THE CLOSURE POINTS AT ALL TIMES DURING CONSTRUCTION.

NCDOT ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - HIGHWAY DESIGN BRANCH- N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.03	TEMPORARY ROAD CLOSURES
1101.04	TEMPORARY SHOULDER CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS
1135.01	CONES
1145.01	BARRICADES
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTI-LANE ROADWAYS
1205.12	PAVEMENT MARKINGS - BRIDGES
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS - PERMANENT AND TEMPORARY
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

PHASING

STEP 1: PLACE MESSAGE SIGNS USING ROADWAY STANDARD DRAWING NUMBERS 1101.04, SHEET 1 OF 1, 1101.11, SHEET 1 OF 4, 1101.03, SHEET 1 OF 9, AND SHEET TMP-3, INSTALL AND COVER DETOUR SIGNING.

STEP 2: USING ROADWAY STANDARD DRAWING NUMBER 1101.03, SHEET 1 OF 9, UNCOVER OFF-SITE DETOUR SIGNING AND INSTALL TYPE III BARRICADES TO CLOSE OLD NC 75 TO THRU TRAFFIC.

STEP 3: PLACE TRAFFIC ONTO OFF-SITE DETOUR. PERFORM PROPOSED BRIDGE AND ROADWAY CONSTRUCTION. PLACE FINAL PAVEMENT MARKINGS AND MARKERS.

STEP 4: REMOVE TYPE III BARRICADES FROM OLD NC 75 AND REOPEN ROADWAY TO TRAFFIC. REMOVE ALL DETOUR SIGNING.

FINAL PAVEMENT MARKING SCHEDULE

DESCRIPTION	QUANTITY
THERMOPLASTIC WHITE EDGELINE (4")	1,300 LF
THERMOPLASTIC YELLOW DOUBLE CENTER (4")	1,300 LF
PERMANENT RAISED PAVEMENT MARKERS (YELLOW & YELLOW)	8 EA

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LICENSE NO. F-0669

APPROVED: DocuSigned by: James Timothy Jordan DATE: 5/18/2016

SEAL 21102 NORTH CAROLINA PROFESSIONAL ENGINEER JAMES TIMOTHY JORDAN

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DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

GENERAL NOTES
ROADWAY STANDARD DRAWINGS
PHASING
PAVEMENT MARKING SCHEDULE

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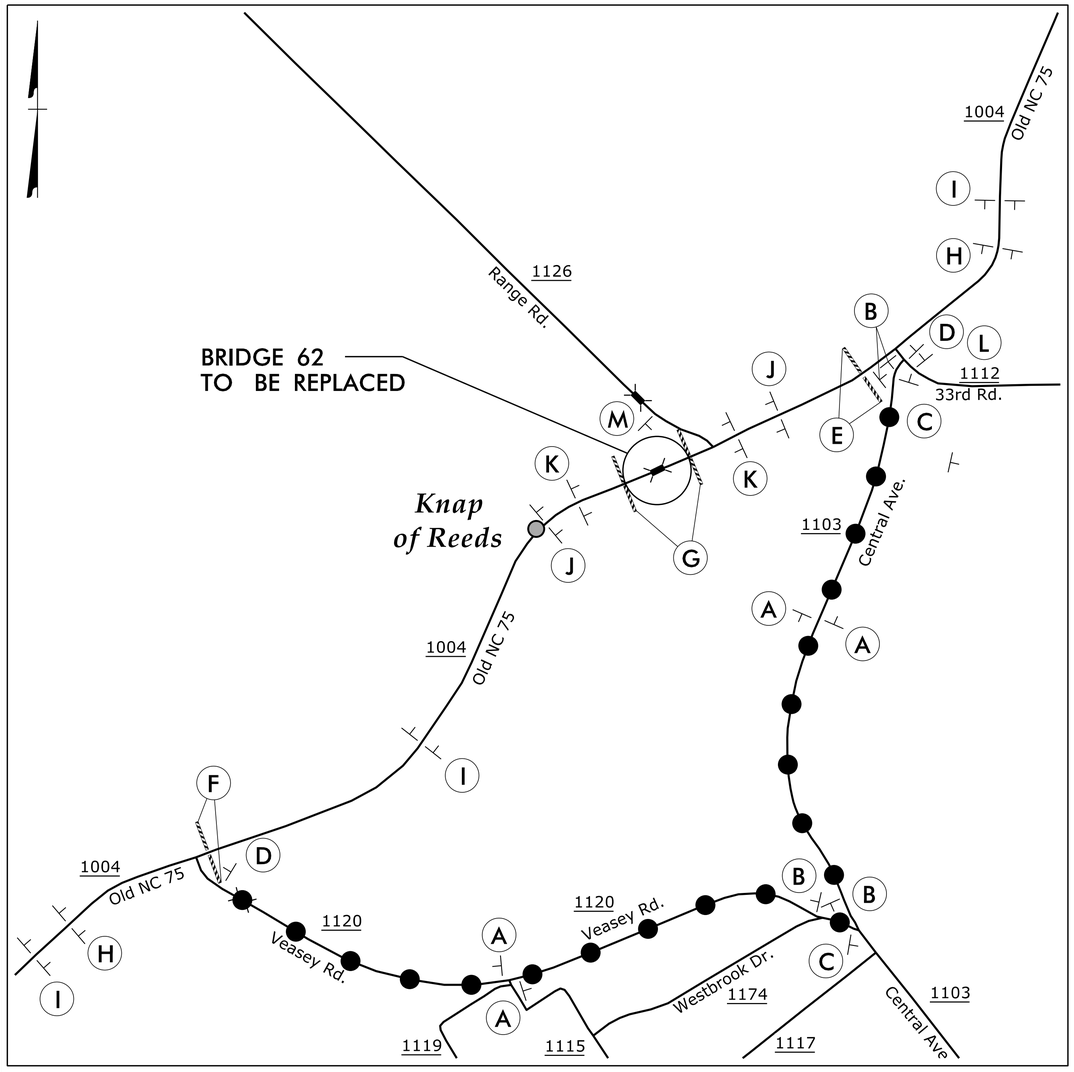
PROJECT REFERENCE NUMBER	SHEET NO.
17BP.5.R.53 GRANVILLE 62	TMP-3

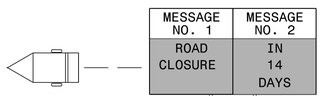
TRAFFIC CONTROL TEMPORARY SIGNING AND DEVICES



NOTES: REFER TO ROADWAY STANDARD DRAWING NO. 1101.03, SHEETS 1 AND 2 OF 9, FOR ADDITIONAL SIGN SPACING REQUIREMENTS APPROACHING PROJECT SITE CLOSURE POINT.

✱ SEE SHEET TMP-4 FOR SPECIAL SIGN DESIGNS

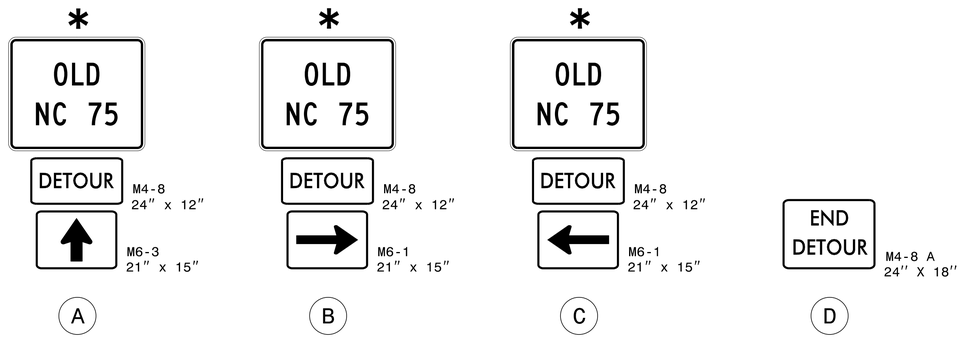
LEGEND	
	DETOUR ROUTE
⊢	STATIONARY SIGN
	TYPE III BARRICADE

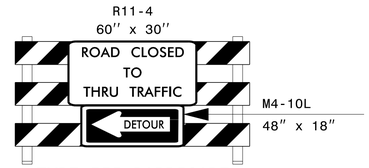


CHANGEABLE MESSAGE SIGN

USE CHANGEABLE MESSAGE SIGNS FOR A 14-DAY COUNTDOWN ROAD CLOSURE NOTICE PRIOR TO CLOSING BUTNER ROAD TO THRU TRAFFIC.

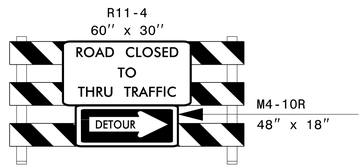
INSTALL CHANGEABLE MESSAGE SIGNS AT THE DETOUR POINTS AND AS DIRECTED BY THE ENGINEER.





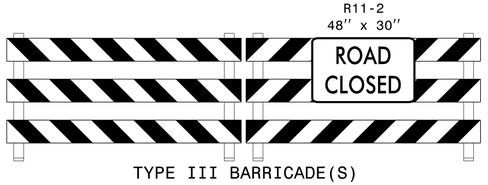
TYPE III BARRICADE

E



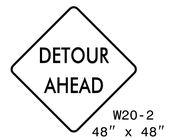
TYPE III BARRICADE

F



TYPE III BARRICADE(S)

G



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K

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M

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APPROVED: DocuSigned by: James Timothy Jordan DATE: 5/18/2016

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JORDAN

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DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

OLD NC 75 OFF-SITE DETOUR TRAFFIC CONTROL TEMPORARY SIGNING AND DEVICES

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jar66165

PROJECT REFERENCE NUMBER	SHEET NO.
17BP.5.R.53 GRANVILLE 62	TMP-4

SIGN NUMBER: SD-1
TYPE: D
QUANTITY: SEE PLANS

SIGN WIDTH: 3′-0″
HEIGHT: 2′-6″
TOTAL AREA: 7.5 Sq.Ft.

BORDER TYPE: INSET
RECESS: 0.47″
WIDTH: 0.63″
RADII: 1.5″

NO. Z BARS:
LENGTH:

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

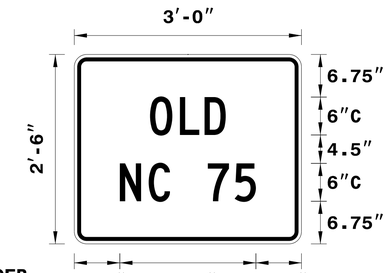
SYMBOL	X	Y	WID	HT

MAT′L: 0.080″ (2.0 mm) ALUMINUM

DESIGN BY: BLP
PROJECT ID: 17BP.5.R.53
CHECKED BY: NKP
DIV: 5
DATE: Mar 22, 2016

USE NOTES: 1,2

1. Legend and border shall be direct applied black non-reflective sheeting.
2. Background shall be NC GRADE B fluoresent orange retroreflective sheeting.



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter locations are panel edge to lower left corner

																											Series/Size Text Length
	O	L	D																								C 2000
	12	16.7	20.6																								12
	N	C		7	5																						C 2000
	7.2	11.8	15.2	21.2	25.4																						21.5

FILENAME: 380062_TC_TMP_SD1

NORTH CAROLINA D.O.T. SIGN DETAIL

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(919) 552-2254 (Fax)
www.hatchmott.com
LICENSE NO. F-0669

APPROVED: DocuSigned by: Nathan K. Phillips DATE: 5/23/2016

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023488 ENGINEER NATHAN K. PHILLIPS

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DIVISION OF HIGHWAYS * STATE OF NORTH CAROLINA * DEPARTMENT OF TRANSPORTATION * WORK ZONE TRAFFIC CONTROL

SIGN DESIGN

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jar66165

CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 4

PROJECT REFERENCE	SHEET NO.
17BP.5.R.53 – GRANVILLE 62	EC-1/CONST.4

ALEXANDER D. SNIDER, P.E.
ROADSIDE ENVIRONMENTAL ENGINEER
3064
LEVEL III CERTIFICATION NUMBER

TRENTON J. CORMIER, P.E.
ROADSIDE ENVIRONMENTAL PROJECT ENGINEER
3377
LEVEL III CERTIFICATION NUMBER

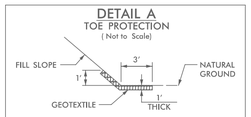
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:
Hatch Mott MacDonald
PO Box 700
Fuquay-Varina, NC 27526
www.hatchmott.com

ICA Engineering
5121 Kingsdown Way, Suite 100
Raleigh, NC 27607
NC License No: P-0258

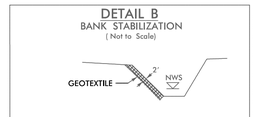
HORIZONTAL SCALE
25' 0 25' 50'

DETAIL A
TOE PROTECTION
(Not to Scale)



Type of Liner= CLASS B RIP RAP
–L– STA. 16+45 TO STA. 16+95 RT

DETAIL B
BANK STABILIZATION
(Not to Scale)



Type of Liner= CLASS II RIP RAP
–L– STA. 15+14 TO STA. 15+39
–L– STA. 15+77 TO STA. 16+11

THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.

ENVIRONMENTALLY SENSITIVE AREA(S) EXIST ON THIS PROJECT

Refer To E. C. Special Provisions for Special Considerations.

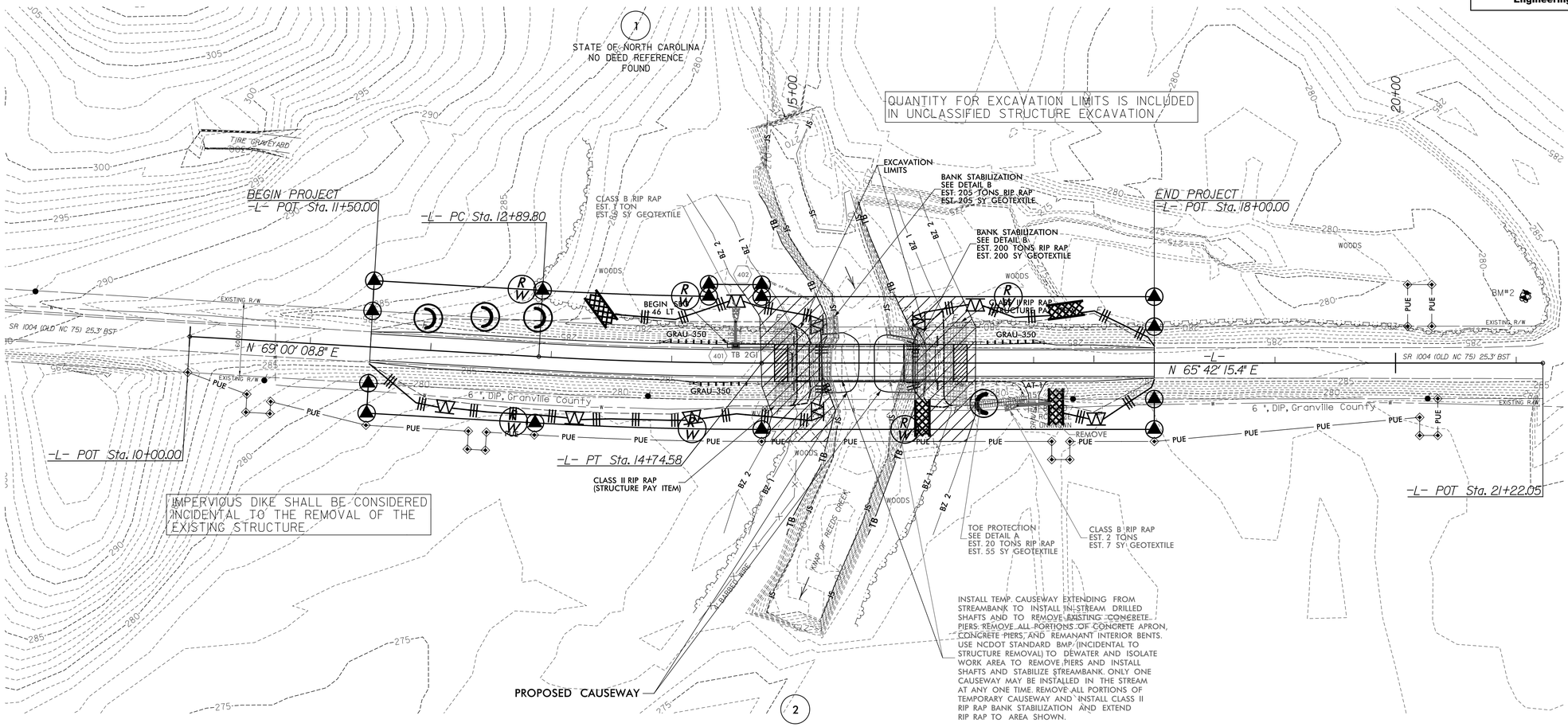
303(d) IMPAIRED WATER(S) EXIST ON THIS PROJECT

303(d) Impaired Water Zone(s) Exist
From Sta. 11+50 –L–
to Sta. 18+00 –L–
Refer To E. C. Special Provisions for Special Considerations.

NAD 83/NA 2011

EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1633.01	Temporary Rock Silt Check Type-A	
1633.02	Wattle / Excelsior Wattle with Polyacrylamide (PAM)	



THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG–010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 3, 2011 AND ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF WATER RESOURCES.

Prepared In the Office of:

ICA ENGINEERING, INC.
5121 KINGDOM WAY, SUITE 100
RALEIGH NC 27607
NC LICENSE NO: F–0258

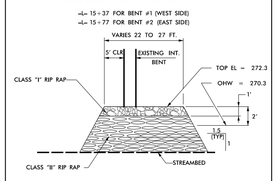
2012 STANDARD SPECIFICATIONS

Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"– Roadway Design Unit – N. C. Department of Transportation – Raleigh, N. C., dated January 2012 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01	Railroad Erosion Control Detail	1632.01	Rock Inlet Sediment Trap Type A
1605.01	Temporary Silt Fence	1632.02	Rock Inlet Sediment Trap Type B
1606.01	Special Sediment Control Fence	1632.03	Rock Inlet Sediment Trap Type C
1607.01	Gravel Construction Entrance	1633.01	Temporary Rock Silt Check Type A
1622.01	Temporary Berms and Slope Drains	1633.02	Temporary Rock Silt Check Type B
1630.01	Riser Basin	1634.01	Temporary Rock Sediment Dam Type A
1630.02	Silt Basin Type B	1634.02	Temporary Rock Sediment Dam Type B
1630.03	Temporary Silt Ditch	1635.01	Rock Pipe Inlet Sediment Trap Type A
1630.04	Stilling Basin	1635.02	Rock Pipe Inlet Sediment Trap Type B
1630.05	Temporary Diversion	1640.01	Coir Fiber Baffle
1630.06	Special Stilling Basin	1645.01	Temporary Stream Crossing
1631.01	Matting Installation		

DETAIL OF CAUSEWAY



VOLUME OF CLASS "B" RIP RAP BELOW OHW: 237 CY

159 CY (BENT #1 – WEST SIDE)
162 CY (BENT #2 – EAST SIDE)

ENVIRONMENTALLY SENSITIVE AREA
SEE PROJECT SPECIAL PROVISIONS

NOTE:
UTILIZE SPECIAL STILLING BASINS FOR DRILLED PIERS

NOTE:
ALL EROSION CONTROL DEVICES SHOWN ARE LOCATED WITHIN EXISTING R/W OR EASEMENT.

$$DATE$$ 4/19/2016
380062_hyd_erosion_c&g.dgn
ICA ENGINEERING, INC.

PROJECT REFERENCE	SHEET NO.
17BP.5.R.53 – GRANVILLE 62	EC-2/CONST.4

ALEXANDER D. SNIDER, P.E.
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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PO Box 700
Fuquay-Varina, NC 27526
www.hatchmott.com
ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
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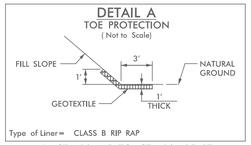
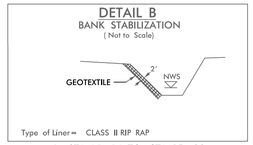
HORIZONTAL SCALE
25' 0 25' 50'



–L– STA. 16+45 TO STA. 16+95 RT



–L– STA. 15+14 TO STA. 15+39
–L– STA. 15+77 TO STA. 16+11

THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.

ENVIRONMENTALLY SENSITIVE AREA(S) EXIST ON THIS PROJECT

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303(d) IMPAIRED WATER(S) EXIST ON THIS PROJECT

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From Sta. 11+50 –L–
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Refer To E. C. Special Provisions for Special Considerations.

NAD 83/NA 2011

EROSION AND SEDIMENT CONTROL MEASURES

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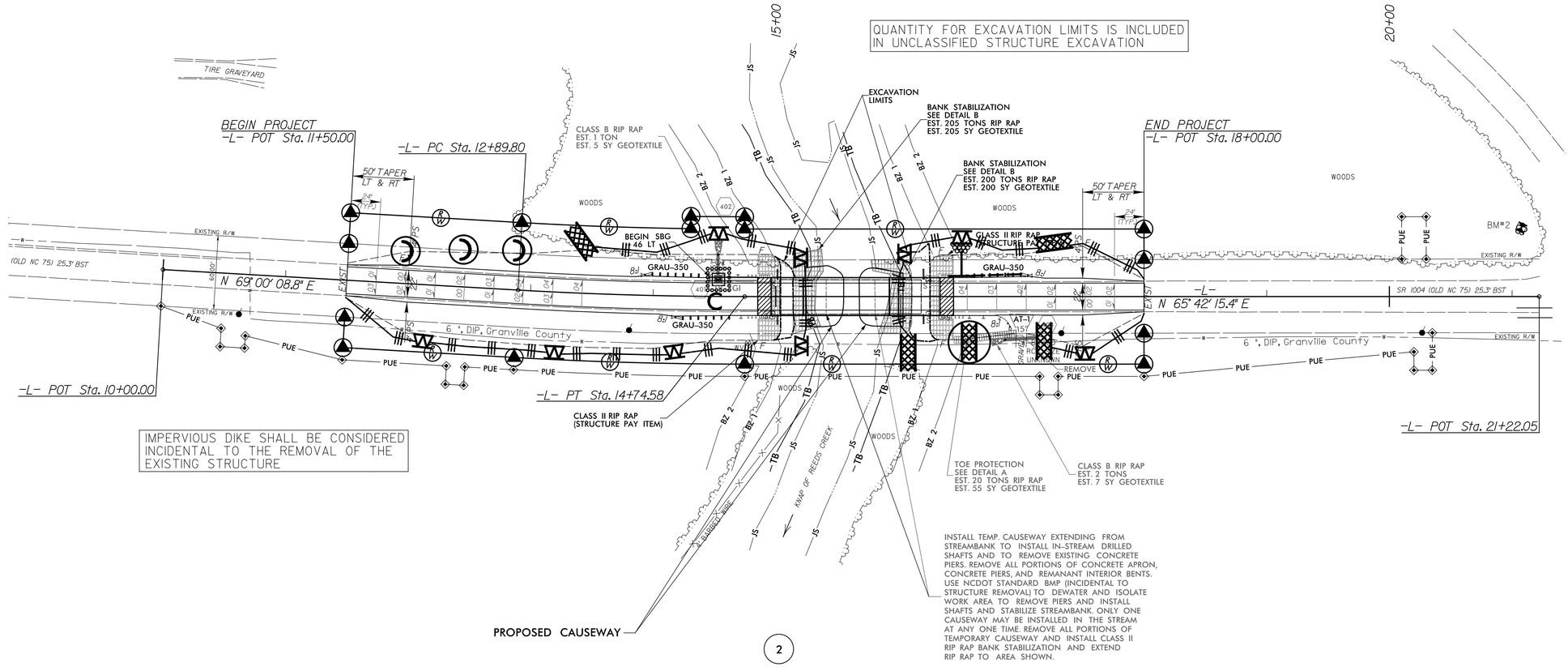
1622.01	Temporary Berms and Slope Drains	
1633.01	Temporary Rock Silt Check Type-A	
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	
1633.02	Wattle / Excelsior Wattle with Polyacrylamide (PAM)	
1632.03	Rock Inlet Sediment Trap: Type C	C

1

STATE OF NORTH CAROLINA
NO DEED REFERENCE FOUND



2

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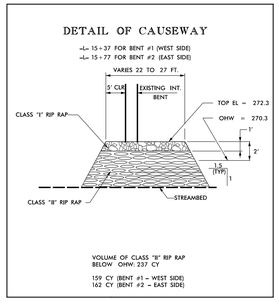


Place Matting for Erosion Control on 2:1 Slope

NOTE:
UTILIZE SPECIAL STILLING BASINS FOR DRILLED PIERS

NOTE:
ALL EROSION CONTROL DEVICES SHOWN ARE LOCATED WITHIN EXISTING R/W OR EASEMENT.

$$DATE$$ 4/19/2016
380062_hyd_erosion_final.dgn
ICA ENGINEERING, INC.

PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.53 – GRANVILLE 62	EC-3

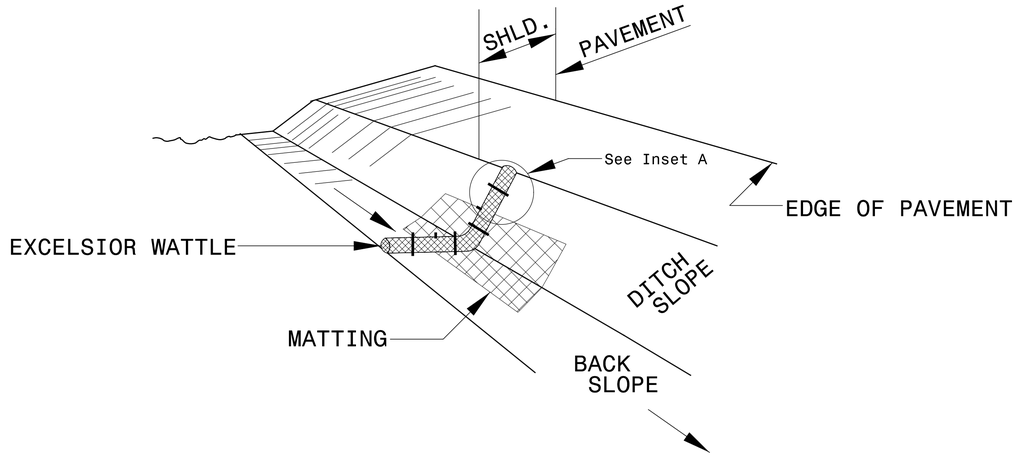
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

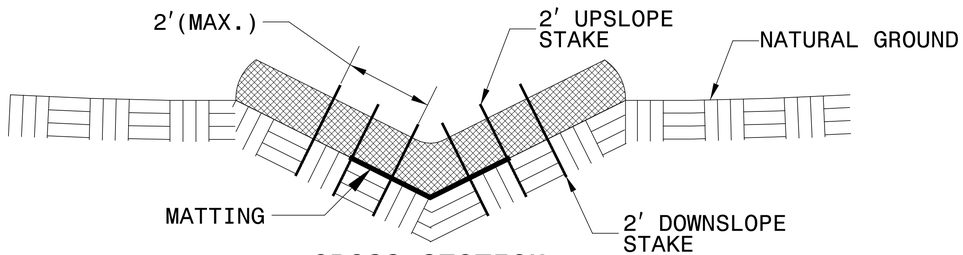
SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.

PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.53 – GRANVILLE 62	EC–4

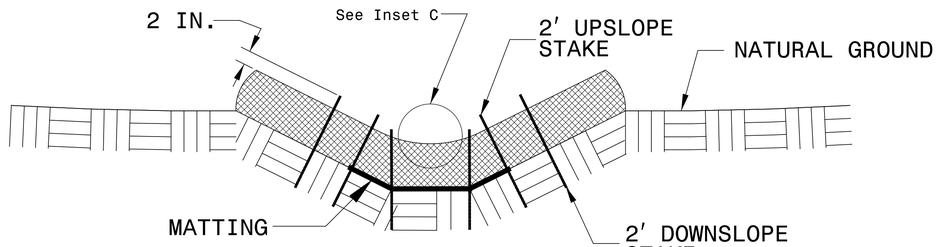
WATTLE WITH POLYACRYLAMIDE (PAM) DETAIL



ISOMETRIC VIEW



CROSS SECTION VEE DITCH



CROSS SECTION TRAPEZOIDAL DITCH

NOTES:

USE MINIMUM 12 IN. DIAMETER EXCELSIOR WATTLE.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.

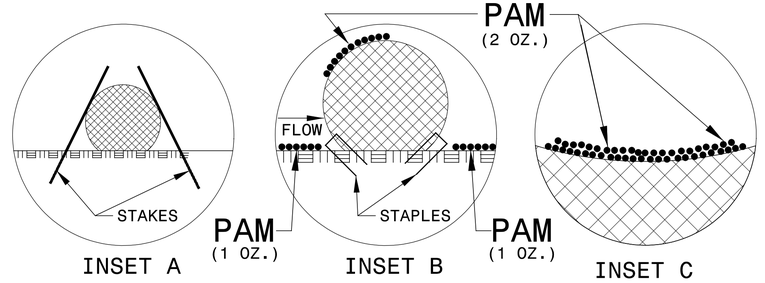
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12″ IN LENGTH.

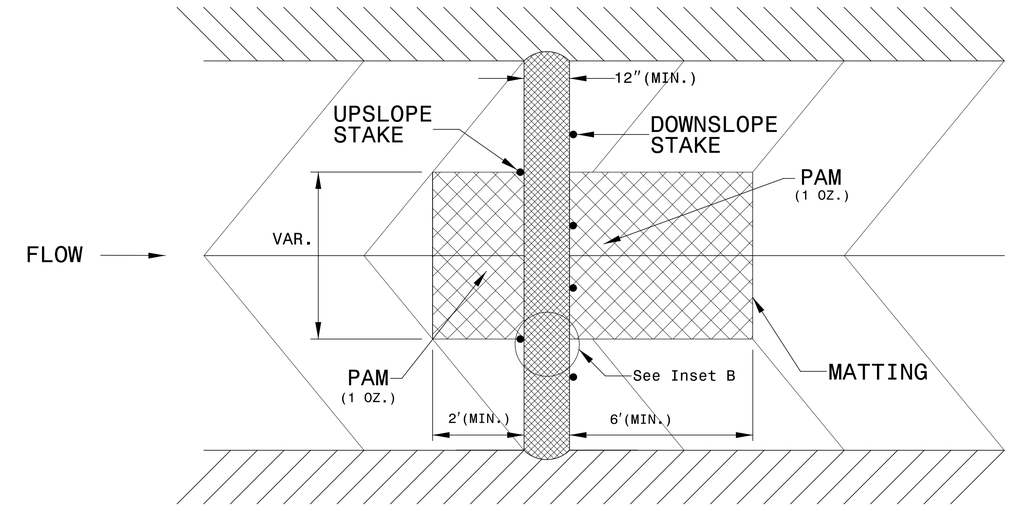
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH WATTLE.

INITIALLY APPLY 2 OUNCES OF ANIONIC OR NEUTRALLY CHARGED PAM OVER WATTLE WHERE WATER WILL FLOW AND 1 OUNCE OF PAM ON MATTING ON EACH SIDE OF WATTLE. REAPPLY PAM AFTER EVERY RAINFALL EVENT THAT IS EQUAL TO OR EXCEEDS 0.50 IN.

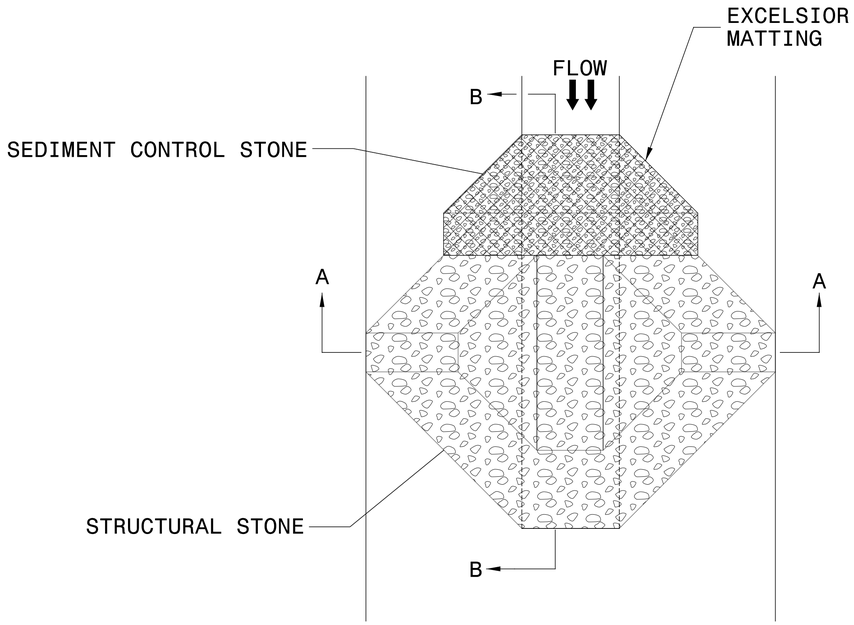




TOP VIEW

PROJECT REFERENCE NO.	SHEET NO.
17BP.5.R.53 – GRANVILLE 62	EC-5

TEMPORARY ROCK SILT CHECK TYPE 'A' WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM)



PLAN

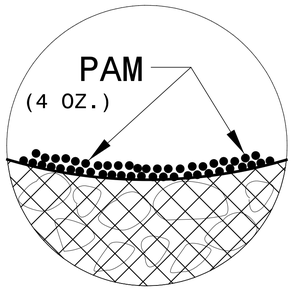
NOTES:

INSTALL TEMPORARY ROCK SILT CHECK TYPE A IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1633.01.

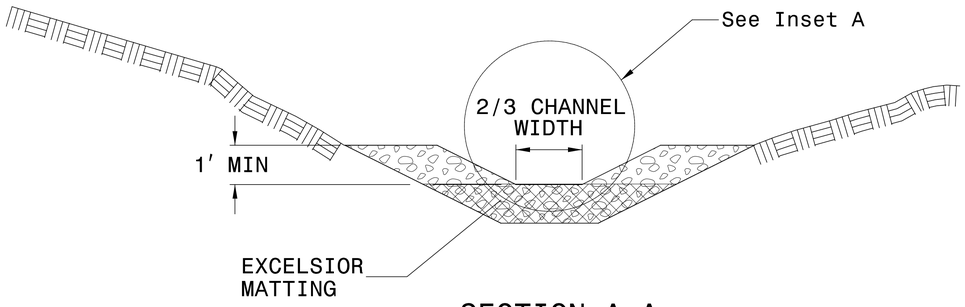
USE EXCELSIOR FOR MATTING MATERIAL AND ANCHOR MATTING SECTION AT TOP AND BOTTOM WITH CLASS B STONE.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH ROCK SILT CHECK.

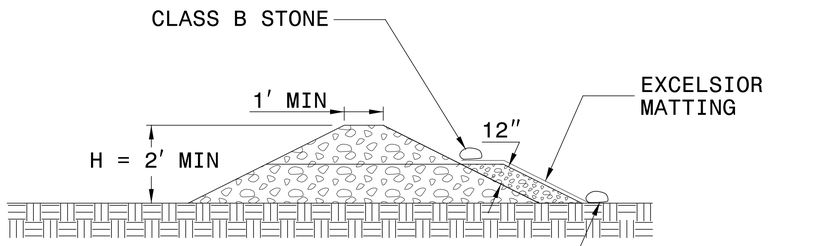
INITIALLY APPLY 4 OUNCES OF POLYACRYLAMIDE (PAM) TO TOP OF MATTING SECTION AND AFTER EVERY RAINFALL EVENT THAT EQUALS OR EXCEEDS 0.50 INCHES.



INSET A



SECTION A-A



SECTION B-B

NOT TO SCALE

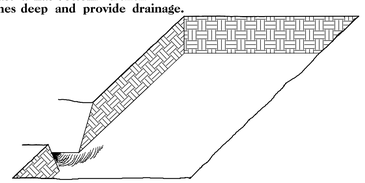
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.5.R.53 – GRANVILLE 62	RF–1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	

PLANTING DETAILS

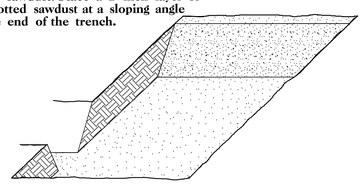
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

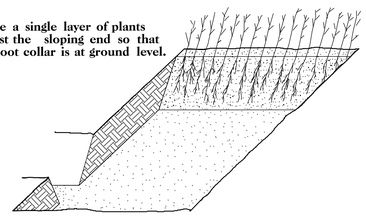
1. Locate a healing–in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



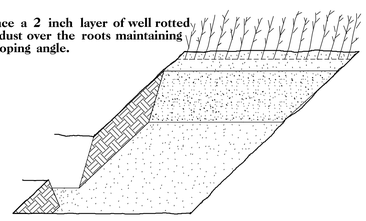
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

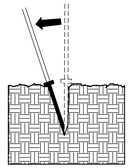


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

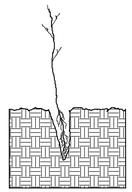


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

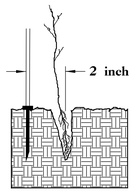
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



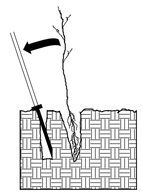
1. Insert planting bar as shown and pull handle toward planter.



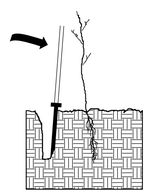
2. Remove planting bar and place seedling at correct depth.



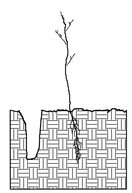
3. Insert planting bar 2 inches toward planter from seedling.



4. Pull handle of bar toward planter, firming soil at bottom.



5. Push handle forward firming soil at top.



6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.

KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.

ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

REFORESTATION

☐ TREE REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

25%	LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in – 18 in BR
25%	PLATANUS OCCIDENTALIS	SYCAMORE	12 in – 18 in BR
25%	FRAXINUS PENNSYLVANICA	GREEN ASH	12 in – 18 in BR
25%	BETULA NIGRA	RIVER BIRCH	12 in – 18 in BR

REFORESTATION DETAIL SHEET

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

PROJECT REFERENCE	SHEET NO.
17BP.5.R.53 – GRANVILLE #62	UO–1

Prepared in the Office of:

THE WOOTEN COMPANY
LICENSE NO. F-0115

THE WOOTEN COMPANY
ENGINEERING | PLANNING | ARCHITECTURE
120 North Boylan Avenue Raleigh NC 27603-1423
919.828.0531 fax 919.834.3589

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALE
25′ 0 25′ 50′

UTILITIES BY OTHERS

NOTE:
ALL PROPOSED UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS

MAD 83/NA 2011

1
STATE OF NORTH CAROLINA
NO DEED REFERENCE
FOUND

15+00

20+00

QUANTITY FOR EXCAVATION LIMITS IS INCLUDED IN UNCLASSIFIED STRUCTURE EXCAVATION

TIRE GRAVEYARD

BEGIN PROJECT
-L- POT Sta. 11+50.00

-L- PC Sta. 12+89.80

END PROJECT
-L- POT Sta. 18+00.00

EXISTING AERIAL POWER TO REMAIN

CLASS B RIP RAP
EST. 1 TON
EST. 5 SY GEOTEXTILE

REMOVE EXIST. O/H POWER

EXCAVATION LIMITS

BANK STABILIZATION
SEE DETAIL B
EST. 205 TONS RIP RAP
EST. 205 SY GEOTEXTILE

BANK STABILIZATION
SEE DETAIL B
EST. 200 TONS RIP RAP
EST. 200 SY GEOTEXTILE

50′ TAPER LT & RT

REMOVE EXIST. O/H POWER

PROP. POLE W/ GUY ANCHOR

BM#2

EXISTING AERIAL POWER TO REMAIN

WOODS

BEGIN SBG +46 LT

GRAU–350

CLASS II RIP RAP (STRUCTURE PAY ITEM)

TB 2GI

SR 1004 (OLD NC 75) 25.3′ BST

36″ RCP

N 69° 00′ 08.8″ E

N 65° 42′ 15.4″ E

-L-

EXISTING R/W

PROP. O/H POW & TEL LINES

PUE

REM

PROP. GUY ANCHOR ON EXIST. POLE

PROP. POLE W/ GUY ANCHOR

PROP. POLE

PROP. GUY ANCHOR ON EXIST. POLE

-L- POT Sta. 10+00.00

-L- PT Sta. 14+74.58

-L- POT Sta. 21+22.05

-BL- 622

TOE PROTECTION
SEE DETAIL A
EST. 20 TONS RIP RAP
EST. 55 SY GEOTEXTILE

CLASS B RIP RAP
EST. 2 TONS
EST. 7 SY GEOTEXTILE

8″ WL BY TRENCHLESS INSTALLATION (BY OTHERS)

EXIST. WATERLINE, FITTINGS, AND RELATED APPURTENANCES IN CONFLICT WITH THE PROJECT TO BE REMOVED BY OTHERS. AFTER RELOCATION REMAINING PORTION OF EXIST. WATER LINE NOT IN CONFLICT TO BE ABANDONED IN PLACE FILLED WITH GROUT PER NCDOT STANDARDS.

IMPERVIOUS DIKE SHALL BE CONSIDERED INCIDENTAL TO THE REMOVAL OF THE EXISTING STRUCTURE

MAP OF REEDS CREEK

BARBED WIRE

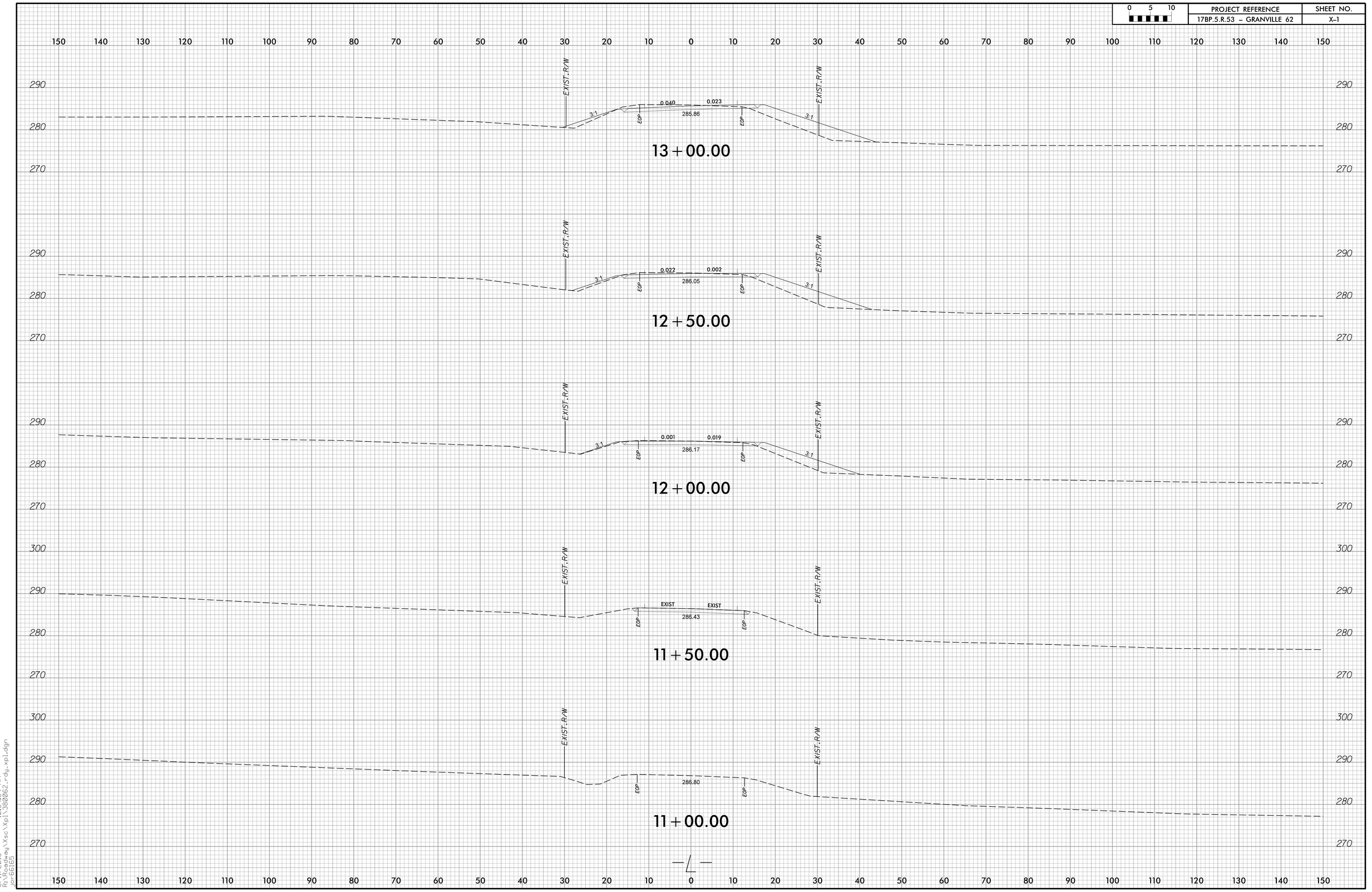
INSTALL TEMP. CAUSEWAY EXTENDING FROM STREAMBANK TO INSTALL IN–STREAM DRILLED SHAFTS AND TO REMOVE EXISTING CONCRETE PIERS. REMOVE ALL PORTIONS OF CONCRETE APRON, CONCRETE PIERS, AND REMANANT INTERIOR BENTS. USE NCDOT STANDARD BMP (INCIDENTAL TO STRUCTURE REMOVAL) TO DEWATER AND ISOLATE WORK AREA TO REMOVE PIERS AND INSTALL SHAFTS AND STABILIZE STREAMBANK. ONLY ONE CAUSEWAY MAY BE INSTALLED IN THE STREAM AT ANY ONE TIME. REMOVE ALL PORTIONS OF TEMPORARY CAUSEWAY AND INSTALL CLASS II RIP RAP BANK STABILIZATION AND EXTEND RIP RAP TO AREA SHOWN.

2
STATE OF NORTH CAROLINA
NO DEED REFERENCE
FOUND

-L-
PI Sta 13+82.21
△ = 3° 17′ 53.4″ (LT)
D = 1° 47′ 05.7″
L = 184.78′
T = 92.42′
R = 3,210.00′

4/15/2016
3:10:46 PM
T:\Projects\Hatch_Mott_MacDonald-3160\B\17BP5R53_Granville_62\CADD\380062_ut_rdy_U01_psh.dgn
jharris

0 5 10	PROJECT REFERENCE	SHEET NO.
	17BP.5.R.53 – GRANVILLE 62	X–1



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jor-66165

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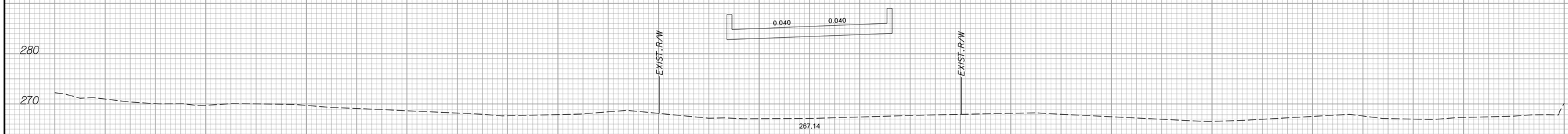
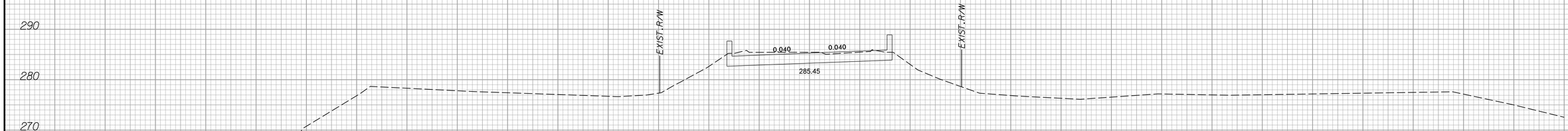
280 270 260



15 + 50.00

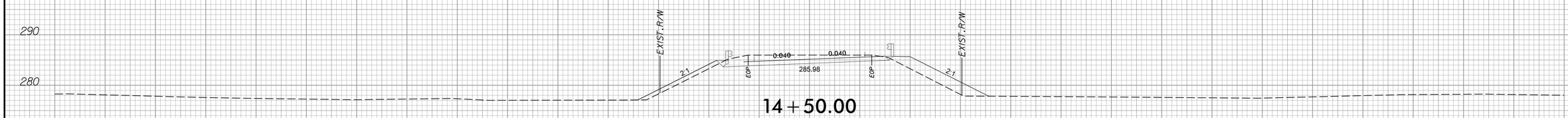
290 280 270 260



15 + 00.00

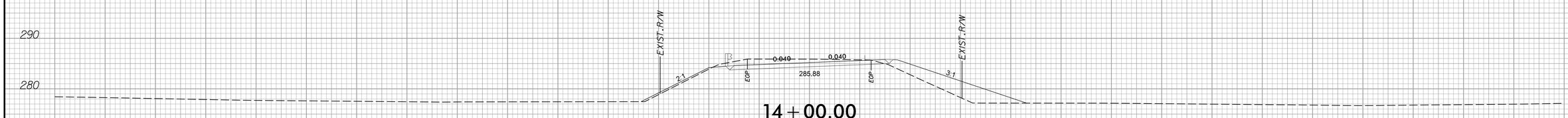
BEGIN BRIDGE 14 + 96.25

290 280 270 260



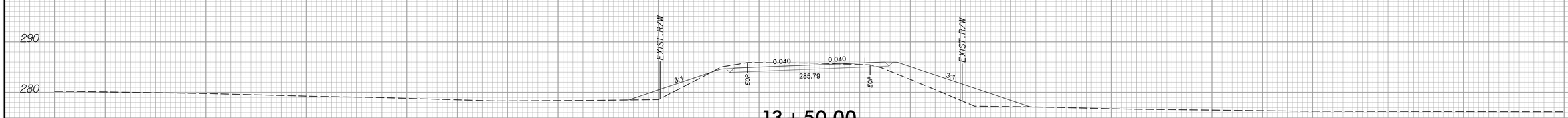
14 + 50.00

290 280 270



14 + 00.00

290 280 270



13 + 50.00

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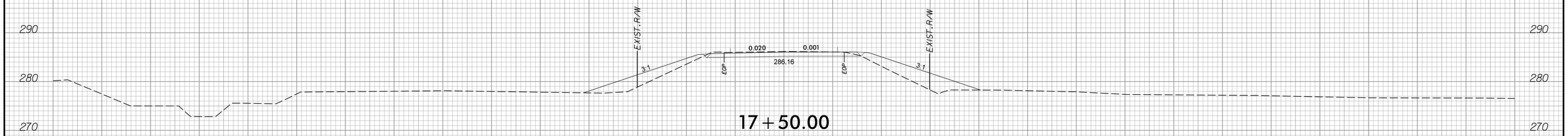
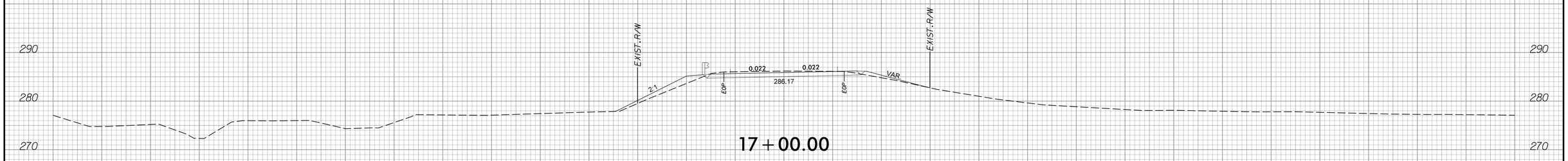
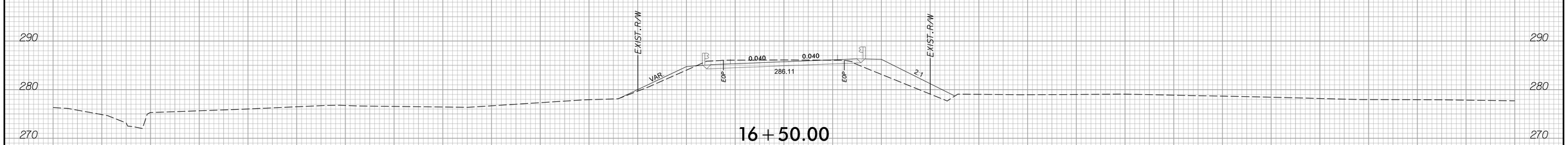


17 + 50.00

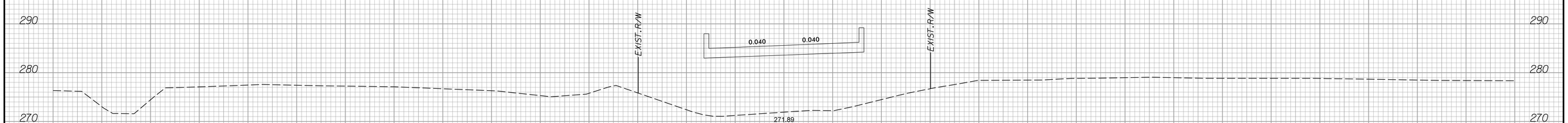


17 + 00.00



16 + 50.00

END BRIDGE 16 + 33.75



16 + 00.00

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jor66165

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	17BP.5.R.53 – GRANVILLE 62	X–4

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290
280
270

EXIST. R/W

EOP

286.22

EOP

EXIST. R/W

18+50.00

290
280
270

EXIST. R/W

EXIST

EXIST

286.17

EOP

EOP

EXIST. R/W

18+00.00

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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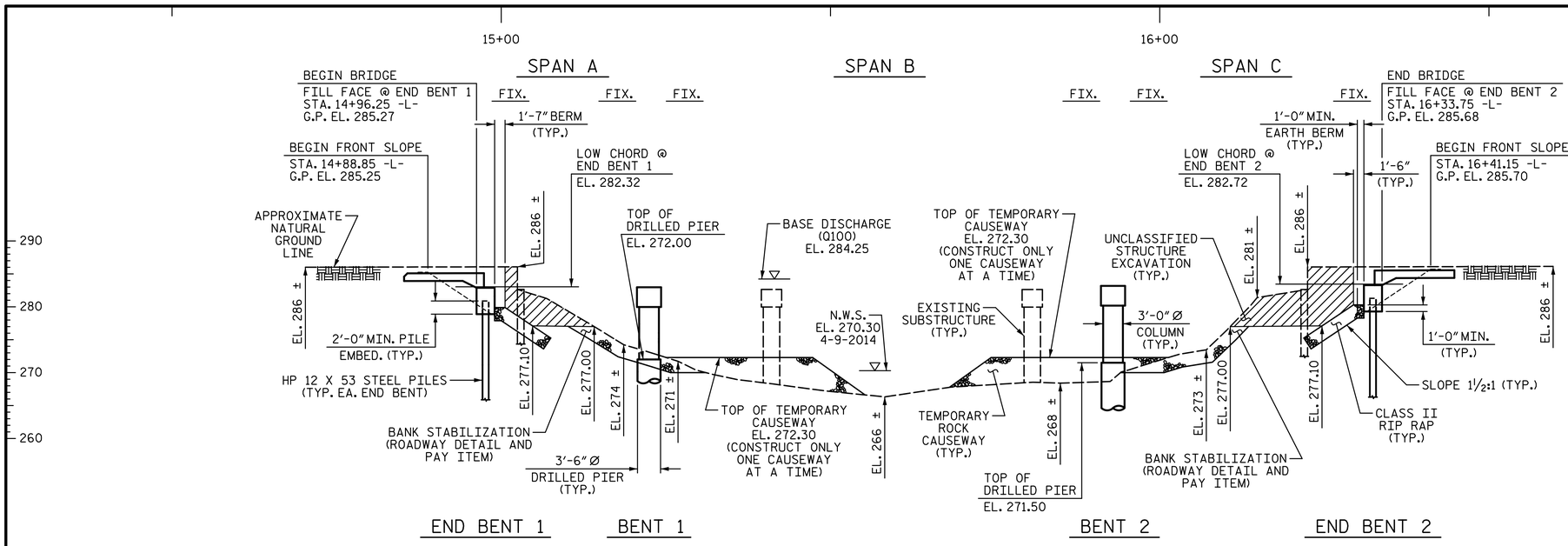
jor66165



SECTION ALONG ℄ SURVEY -L-

(-)0.5148% (+)0.3000%

PVI STA. 14+20.00
EL. = 285.04
VC = 120'

GRADE DATA -L-

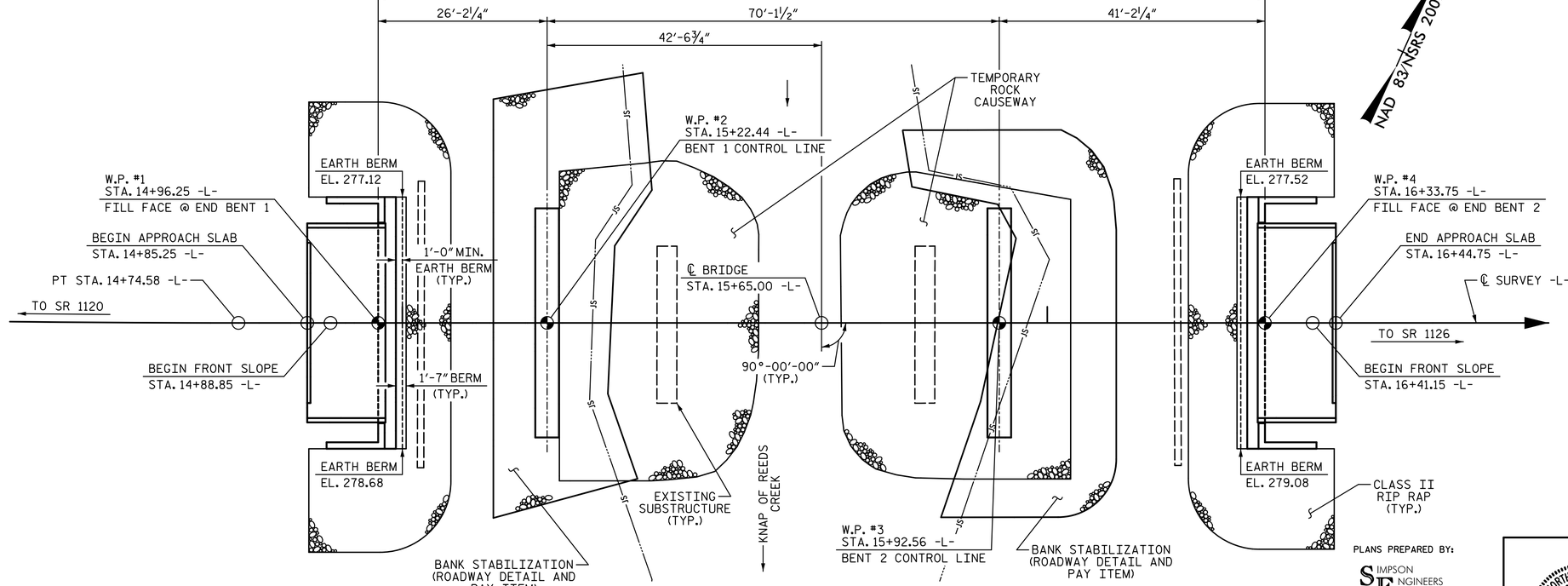
HYDRAULIC DATA:

DESIGN DISCHARGE	= 4200 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YEAR
DESIGN HIGH WATER ELEVATION	= 282.30
DRAINAGE AREA	= 30.0 SQ. MI.
BASE DISCHARGE (Q 100)	= 6320 CFS
BASE HIGH WATER ELEVATION	= 284.25

OVERTOPPING FLOOD DATA:

OVERTOPPING DISCHARGE	= 7550 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500- YEAR
OVERTOPPING FLOOD ELEVATION	= 285.20 **

** OVERTOPPING OCCURS AT ROADWAY SAG AT STA. 14+36.00 -L-



PLAN

(PILES, COLUMNS AND DRILLED PIERS NOT SHOWN IN PLAN VIEW)

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. 17BP.5.R.53

GRANVILLE COUNTY

STATION: 15+65.00 -L-

SHEET 1 OF 2 REPLACES BRIDGE #62

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1004
(OLD NC 75) OVER
KNAP OF REEDS CREEK
BETWEEN SR 1120 AND SR 1126

30'-10" CLEAR ROADWAY - 90° SKEW

PROJ:17BP.5.R.53

DRAWN BY: T. BANKOVICH DATE: 5-16
CHECKED BY: B.S. COX DATE: 5-16
DESIGN ENGINEER OF RECORD: T.J. BEACH DATE: 5-16

PLANS PREPARED BY:

SIMPSON ENGINEERS & ASSOCIATES
5640 Dillard Drive
Suite 200
Cary, NC 27518
(919) 852-0468
(919) 852-0598 (Fax)
www.simpsonengr.com
LICENSURE NO. C-2521

NORTH CAROLINA PROFESSIONAL SEAL L4868 ENGINEER BETSY S. COX
5/19/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			21

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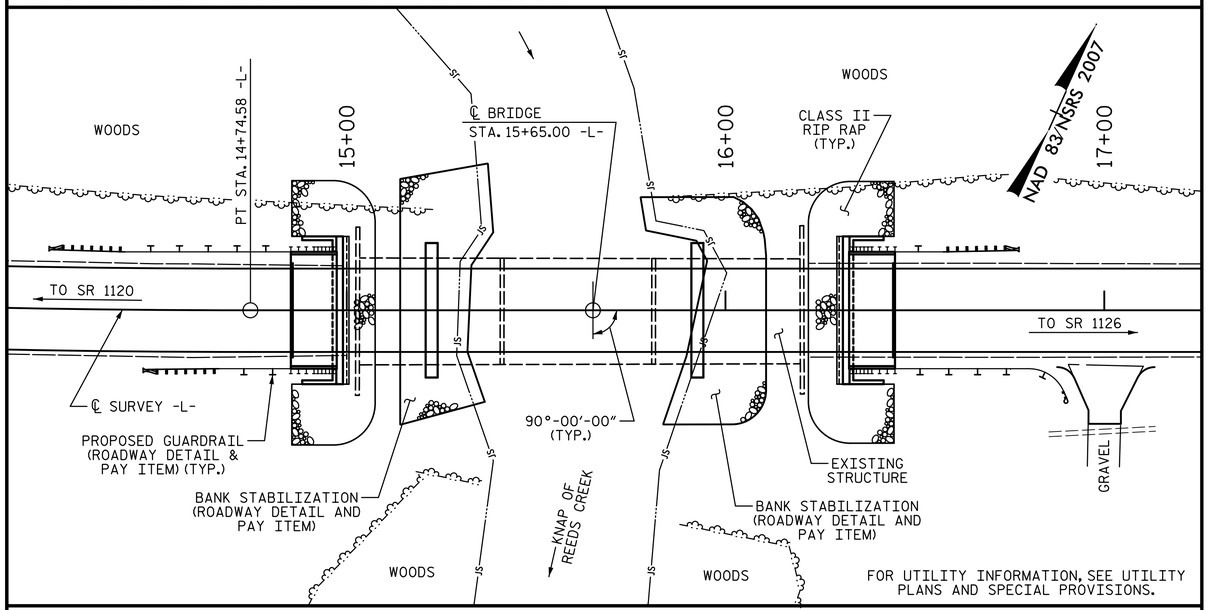
BM #2 RR SPIKE IN 30"PINE, STA. 21+07.49 -L-, 56.16' LT., EL. 281.73



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

EXISTING BRIDGE AND ALL REMNANTS OF THE PREVIOUS BRIDGE TO BE REMOVED IN THEIR ENTIRETY.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 35 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTS OF 3 SPANS @ 40'-0" WITH A CLEAR ROADWAY WIDTH OF 24.00'. THE SUPERSTRUCTURE CONSISTS OF REINFORCED CONCRETE DECK GIRDERS. THE END BENTS ARE REINFORCED CONCRETE CAPS ON PRECAST PRESTRESSED PILES. THE INTERIOR BENTS CONSIST OF REINFORCED CONCRETE CAP AND COLUMNS. THE EXISTING STRUCTURE, INCLUDING THE EXISTING CONCRETE SPILL THROUGH ABUTMENTS, WHICH IS LOCATED AT THE SITE OF THE PROPOSED STRUCTURE, SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, THE LOAD LIMIT MAY BE REDUCED AS NECESSARY DURING THE LIFE OF THE PROJECT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR. THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES."

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 15+65.00 -L-.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE & REMOVAL OF TEMP ACCESS	REMOVAL OF EXISTING STRUCTURE	3'-6" DIA. DRILLED PIERS	PERMANENT STEEL CASING FOR 3'-6" DIA. DRILLED PIERS	SID INSPECTIONS	SPT TESTING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	HP 12 X 53 STEEL PILES		STEEL PILE POINTS	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLABS		ASBESTOS ASSESSMENT
	LS	LS	LF	LF	EA	EA	EA	LS	CY	LS	LB	LB	NO.	LF	EA	LF	TON	SY	LS	NO.	LF	LS
SUPERSTRUCTURE										LS						270.75			LS	33	1,485.00	LS
END BENT 1								LS	21.8		2,642		7	105	7		115	130				
BENT 1	LS		54.0	21.0					20.8		9,284	1,711										
BENT 2	LS		73.5	28.5					21.3		10,436	2,171										
END BENT 2								LS	21.8		2,642		7	105	7		120	135				
TOTAL	LS	LS	127.5	49.5	2	2	2	LS	85.7	LS	25,004	3,882	14	210	14	270.75	235	265	LS	33	1,485.00	LS

FOUNDATION NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 55 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 95 TONS PER PILE.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 65 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 110 TONS PER PILE.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT 1 AND END BENT 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 360 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 55 TSF.

DRILLED PIERS AT BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 425 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 55 TSF.

PERMANENT STEEL CASING MAY BE REQUIRED FOR DRILLED PIERS AT BENT 1. IF REQUIRED, DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 265 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT CASINGS.

PERMANENT STEEL CASING ARE REQUIRED FOR DRILLED PIERS AT BENT 2. DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 262 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

INSTALL DRILLED PIERS AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN 254 FT. AND WITH THE REQUIRED TIP RESISTANCE.

INSTALL DRILLED PIERS AT BENT 2 TO A TIP ELEVATION NO HIGHER THAN 247 FT. AND WITH THE REQUIRED TIP RESISTANCE.

DRILLED PIER EXCAVATION AT BENT 1 AND BENT 2 WILL EXTEND INTO MATERIALS THAT DETERIORATE WHEN EXPOSED TO THE AIR AND WATER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE AND PLACE CONCRETE IMMEDIATELY AFTER THE EXCAVATION IS COMPLETED.

THE SCOUR CRITICAL ELEVATION AT BENT 1 IS ELEVATION 264.5 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

THE SCOUR CRITICAL ELEVATION AT BENT 2 IS ELEVATION 260.0 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

SPT MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SPT. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS AT BENT 1 AND BENT 2. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

IF THE DRILLED PIER HOLE IS LEFT OPEN MORE THAN 24 HOURS AFTER COMPLETION OF EXCAVATION TO THE TIP ELEVATION, THE HOLE MUST BE OVERREAMED.

DRAWN BY: T. BANKOVICH DATE: 5-16
CHECKED BY: B.S. COX DATE: 5-16
DESIGN ENGINEER OF RECORD: T.J. BEACH DATE: 5-16

PLANS PREPARED BY:
SIMPSON ENGINEERING & ASSOCIATES
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LICENSURE NO. C-2521

NORTH CAROLINA PROFESSIONAL SEAL 042268 ENGINEER BETSY S. COX
5/19/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. 17BP.5.R.53
GRANVILLE COUNTY
STATION: 15+65.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1004
(OLD NC 75) OVER
KNAP OF REEDS CREEK
BETWEEN SR 1120 AND SR 1126
30'-10" CLEAR ROADWAY - 90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			21

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LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR STEEL GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE											SERVICE II LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT						
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	⟨1⟩	1.01	- -	1.75	0.273	1.03	B	EL	34.5	0.498	1.04	C	EL	0	0.80	0.273	**1.01**	B	EL	34.5	
		HL-93 (OPERATING)	N/A		1.34	- -	1.35	0.273	1.34	B	EL	34.5	0.498	1.34	C	EL	0	N/A	- -	- -	- -	- -	- -	
		HS-20 (INVENTORY)	36.00	⟨2⟩	1.21	43.6	1.75	0.273	1.34	B	EL	34.5	0.498	**1.21**	C	EL	0	0.80	0.273	1.31	B	EL	34.5	
		HS-20 (OPERATING)	36.00		1.57	56.5	1.35	0.273	1.74	B	EL	34.5	0.498	1.57	C	EL	0	N/A	- -	- -	- -	- -	- -	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.92	39.4	1.40	0.273	3.75	B	EL	34.5	0.498	3.30	C	EL	0	0.80	0.273	2.92	B	EL	34.5	
		SNGARBS2	20.000		2.19	43.8	1.40	0.273	2.81	B	EL	34.5	0.498	2.44	C	EL	0	0.80	0.273	2.19	B	EL	34.5	
		SNAGRIS2	22.000		2.08	45.8	1.40	0.273	2.67	B	EL	34.5	0.498	2.30	C	EL	0	0.80	0.273	2.08	B	EL	34.5	
		SNCOTTS3	27.250		1.45	39.5	1.40	0.273	1.87	B	EL	34.5	0.498	1.65	C	EL	0	0.80	0.273	1.45	B	EL	34.5	
		SNAGGRS4	34.925		1.22	42.6	1.40	0.273	1.57	B	EL	34.5	0.498	1.44	C	EL	0	0.80	0.273	1.22	B	EL	34.5	
		SNS5A	35.550		1.19	42.3	1.40	0.273	1.53	B	EL	34.5	0.498	1.50	C	EL	0	0.80	0.273	1.19	B	EL	34.5	
		SNS6A	39.950		1.10	43.9	1.40	0.273	1.41	B	EL	34.5	0.498	1.40	C	EL	0	0.80	0.273	1.10	B	EL	34.5	
		SNS7B	42.000		1.04	43.7	1.40	0.273	1.34	B	EL	34.5	0.498	1.41	C	EL	0	0.80	0.273	1.04	B	EL	34.5	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.34	44.2	1.40	0.273	1.72	B	EL	34.5	0.498	1.64	C	EL	0	0.80	0.273	1.34	B	EL	34.5	
		TNT4A	33.075		1.34	44.3	1.40	0.273	1.72	B	EL	34.5	0.498	1.56	C	EL	0	0.80	0.273	1.34	B	EL	34.5	
		TNT6A	41.600		1.10	45.8	1.40	0.273	1.41	B	EL	34.5	0.498	1.53	C	EL	0	0.80	0.273	1.10	B	EL	34.5	
		TNT7A	42.000		1.11	46.6	1.40	0.273	1.42	B	EL	34.5	0.498	1.41	C	EL	0	0.80	0.273	1.11	B	EL	34.5	
		TNT7B	42.000		1.15	48.3	1.40	0.273	1.47	B	EL	34.5	0.498	1.35	C	EL	0	0.80	0.273	1.15	B	EL	34.5	
		TNAGRIT4	43.000		1.09	46.9	1.40	0.273	1.40	B	EL	34.5	0.498	1.30	C	EL	0	0.80	0.273	1.09	B	EL	34.5	
		TNAGT5A	45.000		1.03	46.4	1.40	0.273	1.32	B	EL	34.5	0.498	1.34	C	EL	0	0.80	0.273	1.03	B	EL	34.5	
		TNAGT5B	45.000	⟨3⟩	1.01	45.5	1.40	0.273	1.30	B	EL	34.5	0.498	1.23	C	EL	0	0.80	0.273	**1.01**	B	EL	34.5	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE II	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE II LIMIT STATES.

ALLOWABLE STRESS FOR SERVICE II LIMIT STATE ARE AS REQUIRED FOR DESIGN.

DISTANCE FROM LEFT END OF SPAN IS MEASURED FROM ℄ BEARING.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

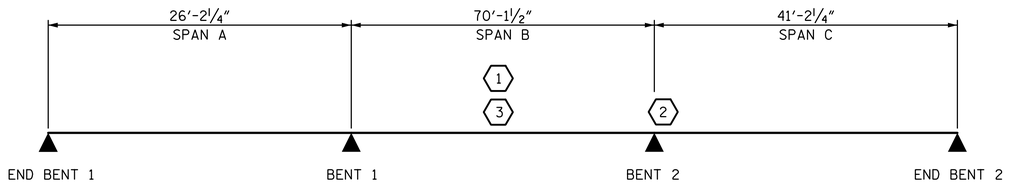
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

PROJECT NO. 17BP.5.R.53

GRANVILLE COUNTY

STATION: 15+65.00 -L-

PLANS PREPARED BY:
SIMPSON ENGINEERS & ASSOCIATES
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LICENSURE NO. C-2521

NORTH CAROLINA PROFESSIONAL SEAL 041268 ENGINEER BETSY S. COX
5/19/2016

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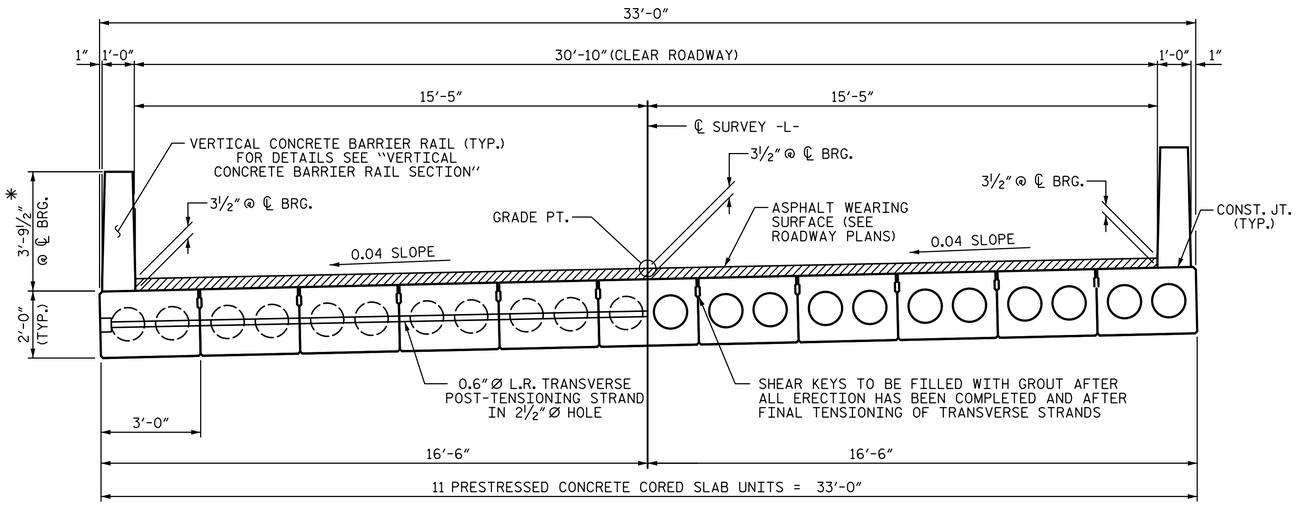
DRAWN BY: S.D. COOPER DATE: 5-16
CHECKED BY: B.S. COX DATE: 5-16
DESIGN ENGINEER OF RECORD: T.J. BEACH DATE: 5-16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR CORED SLAB UNITS 90° SKEW

(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			21



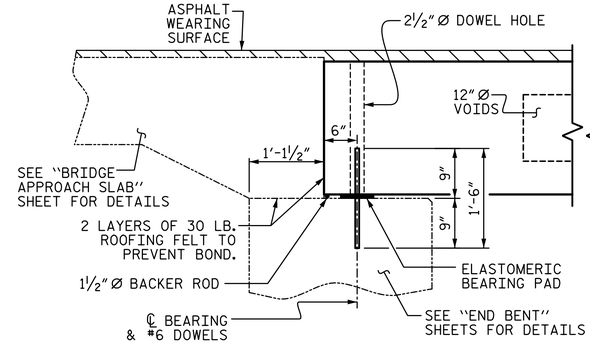
HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

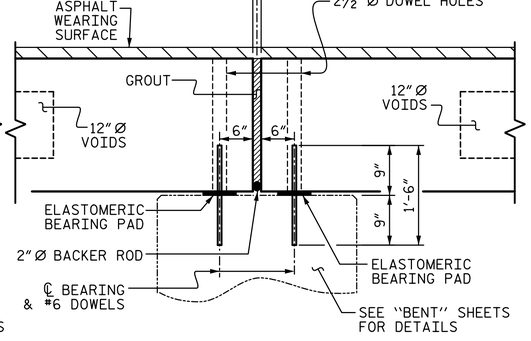
* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS, SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.

FIXED END

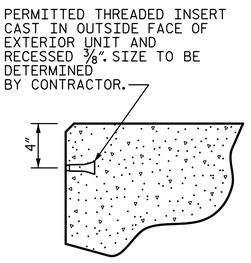


SECTION @ END BENT

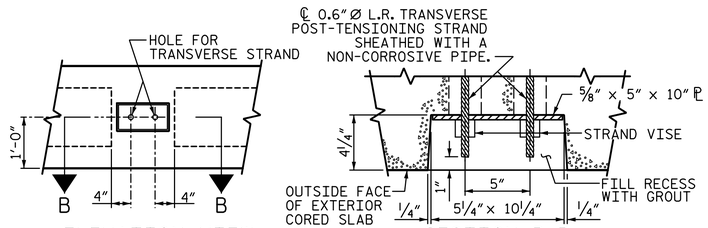
FIXED END FIXED END



SECTION @ BENT



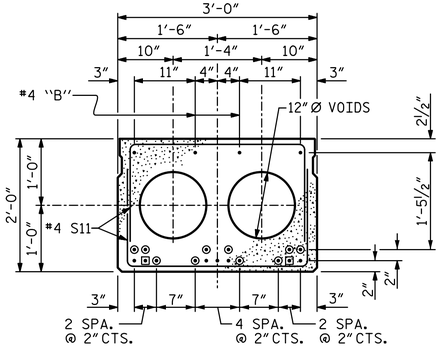
THREADED INSERT DETAIL



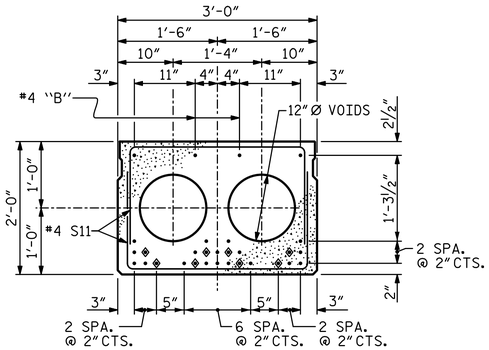
ELEVATION VIEW

SECTION B-B

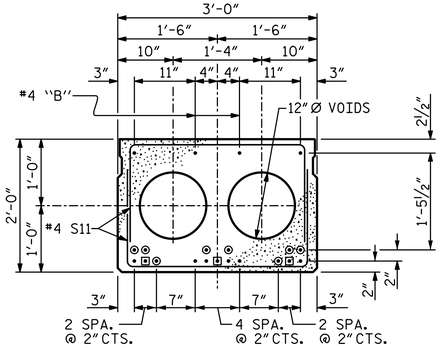
GROUTED RECESS AT END OF POST-TENSIONED STRAND - CORED SLABS



SPAN A - 25′-0″ UNITS
(9 STRANDS REQUIRED)

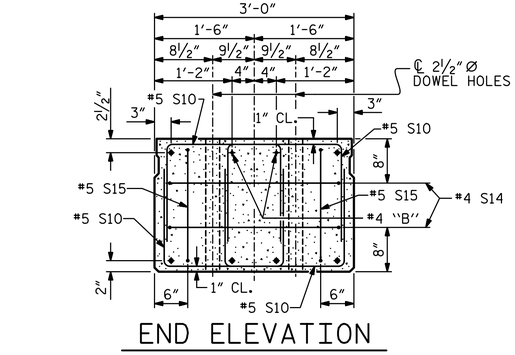


SPAN B - 70′-0″ UNITS
(28 STRANDS REQUIRED)



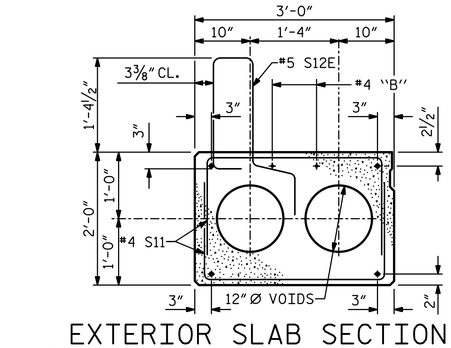
SPAN C - 40′-0″ UNITS
(11 STRANDS REQUIRED)

INTERIOR SLAB SECTIONS 0.6 Ø LOW RELAXATION STRAND LAYOUT



END ELEVATION

SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.) INTERIOR SLAB UNIT SHOWN-EXTERIOR SLAB UNIT SIMILAR EXCEPT SHEAR KEY LOCATION.

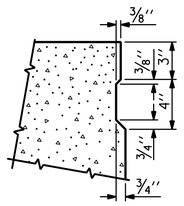


EXTERIOR SLAB SECTION

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

- FULLY DEBONDED STRAND
- ⊡ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 2′-0″ FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
- ◈ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 12′-0″ FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
- ⊙ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND



SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.

PROJECT NO. 17BP.5.R.53
GRANVILLE COUNTY
STATION: 15+65.00 -L-

SHEET 1 OF 6

PLANS PREPARED BY:
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LICENSURE NO. C-2521

NORTH CAROLINA PROFESSIONAL SEAL 030268 ENGINEER BETSY S. COX
5/19/2016

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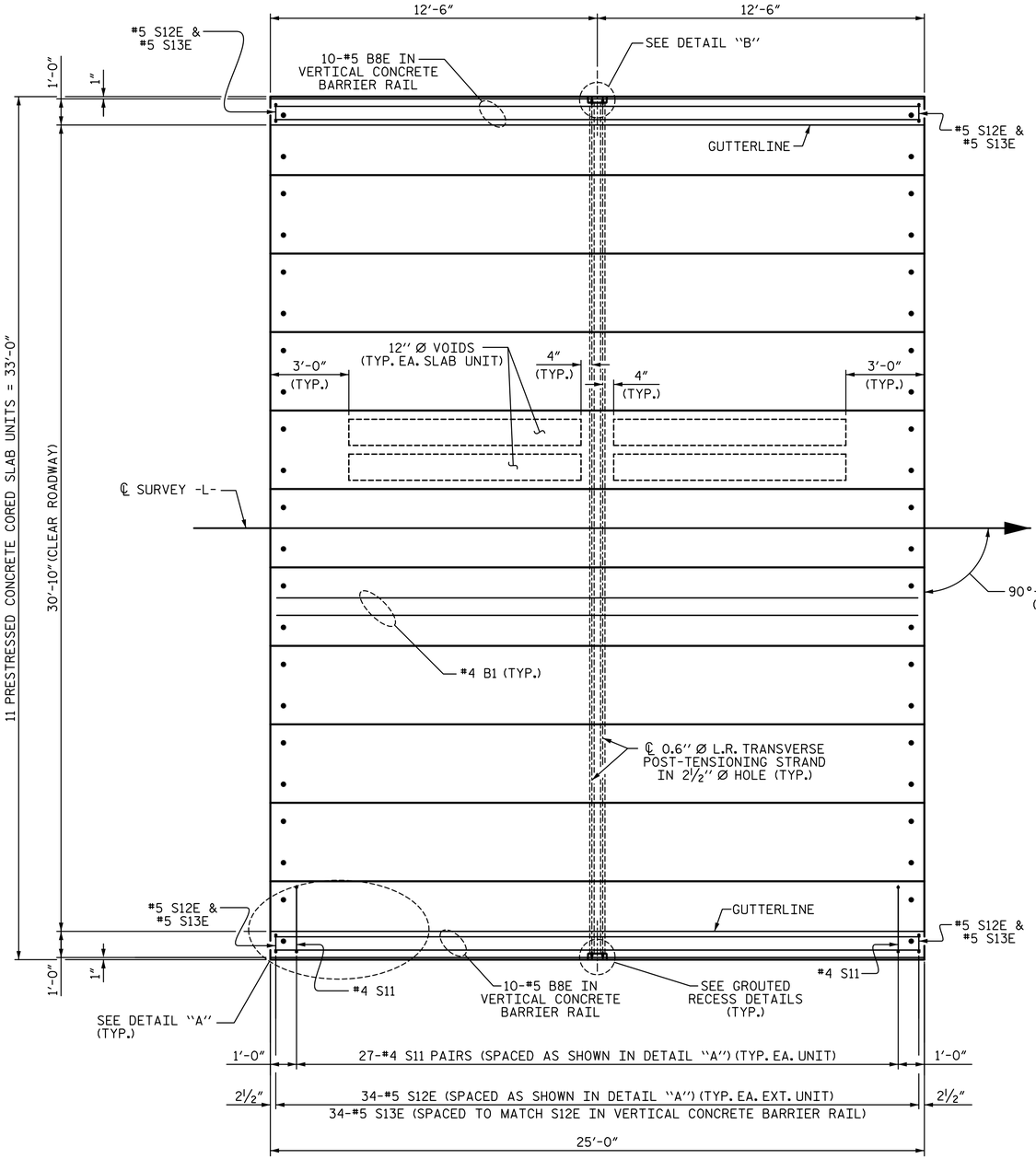
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

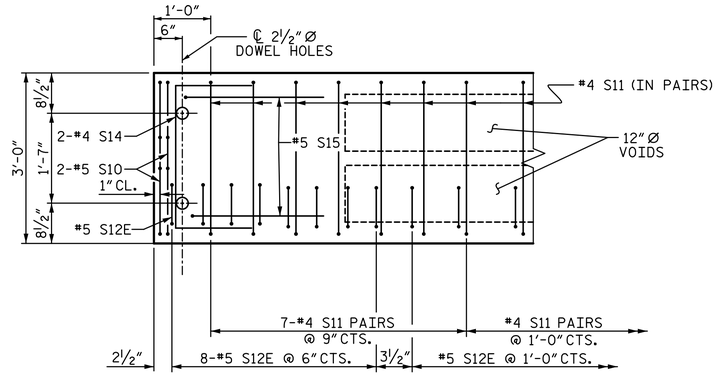
3′-0″ X 2′-0″ PRESTRESSED CONCRETE CORED SLAB UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			21

DRAWN BY: T. BANKOVICH DATE: 5-16
CHECKED BY: B.S. COX DATE: 5-16
DESIGN ENGINEER OF RECORD: T.J. BEACH DATE: 5-16

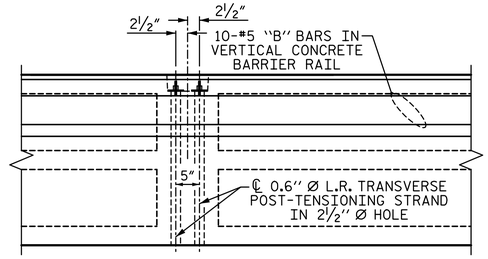


PLAN OF SPAN A UNITS



DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S12E BARS.



DETAIL "B"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1″ CLEAR TO GROUTED RECESS AND 2½″ Ø TRANSVERSE POST-TENSIONING STRAND HOLES

PROJECT NO. 17BP.5.R.53
GRANVILLE COUNTY
STATION: 15+65.00 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF 25′ UNIT 30′-10″ CLEAR ROADWAY

90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			21

PLANS PREPARED BY:
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LICENSURE NO. C-2521

NORTH CAROLINA PROFESSIONAL SEAL 17268 ENGINEER BETSY S. COX
5/19/2016

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DRAWN BY: T. BANKOVICH DATE: 5-16
CHECKED BY: B.S. COX DATE: 5-16
DESIGN ENGINEER OF RECORD: T.J. BEACH DATE: 5-16

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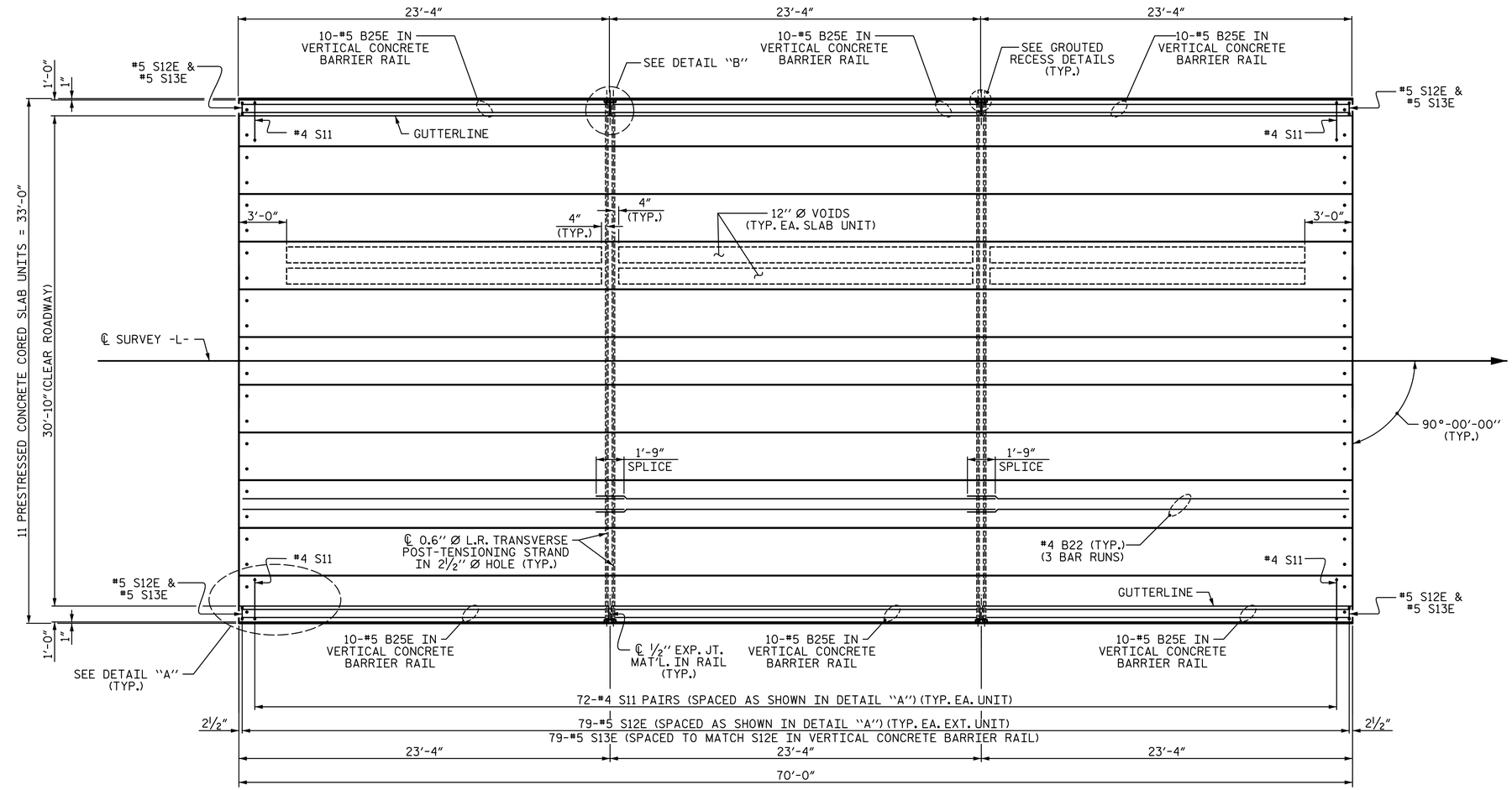
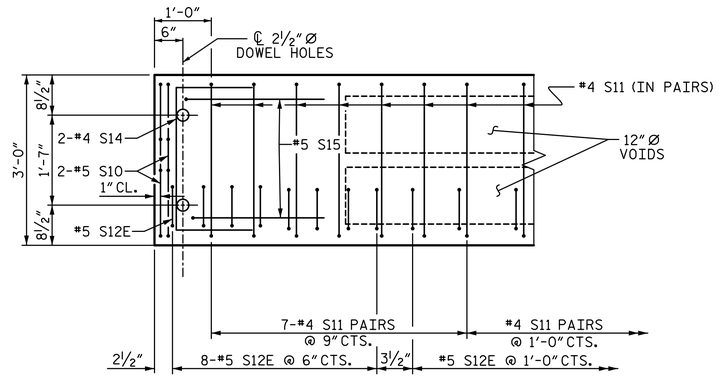
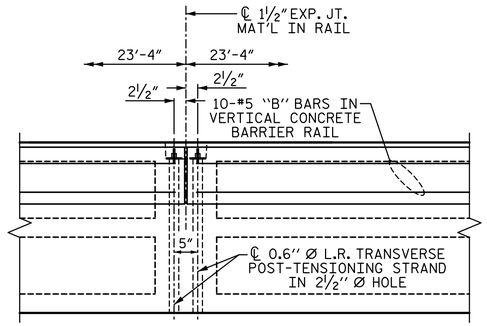


PLAN OF SPAN B UNITS



DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S12E BARS.



DETAIL "B"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1″CLEAR TO GROUTED RECESS AND 2½″ Ø TRANSVERSE POST-TENSIONING STRAND HOLES

DRAWN BY: T. BANKOVICH DATE: 5-16
CHECKED BY: B.S. COX DATE: 5-16
DESIGN ENGINEER OF RECORD: T.J. BEACH DATE: 5-16

PLANS PREPARED BY:
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NORTH CAROLINA PROFESSIONAL SEAL 037268 ENGINEER BETSY S. COX
5/19/2016

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PROJECT NO. 17BP.5.R.53
GRANVILLE COUNTY
STATION: 15+65.00 -L-
SHEET 3 OF 6

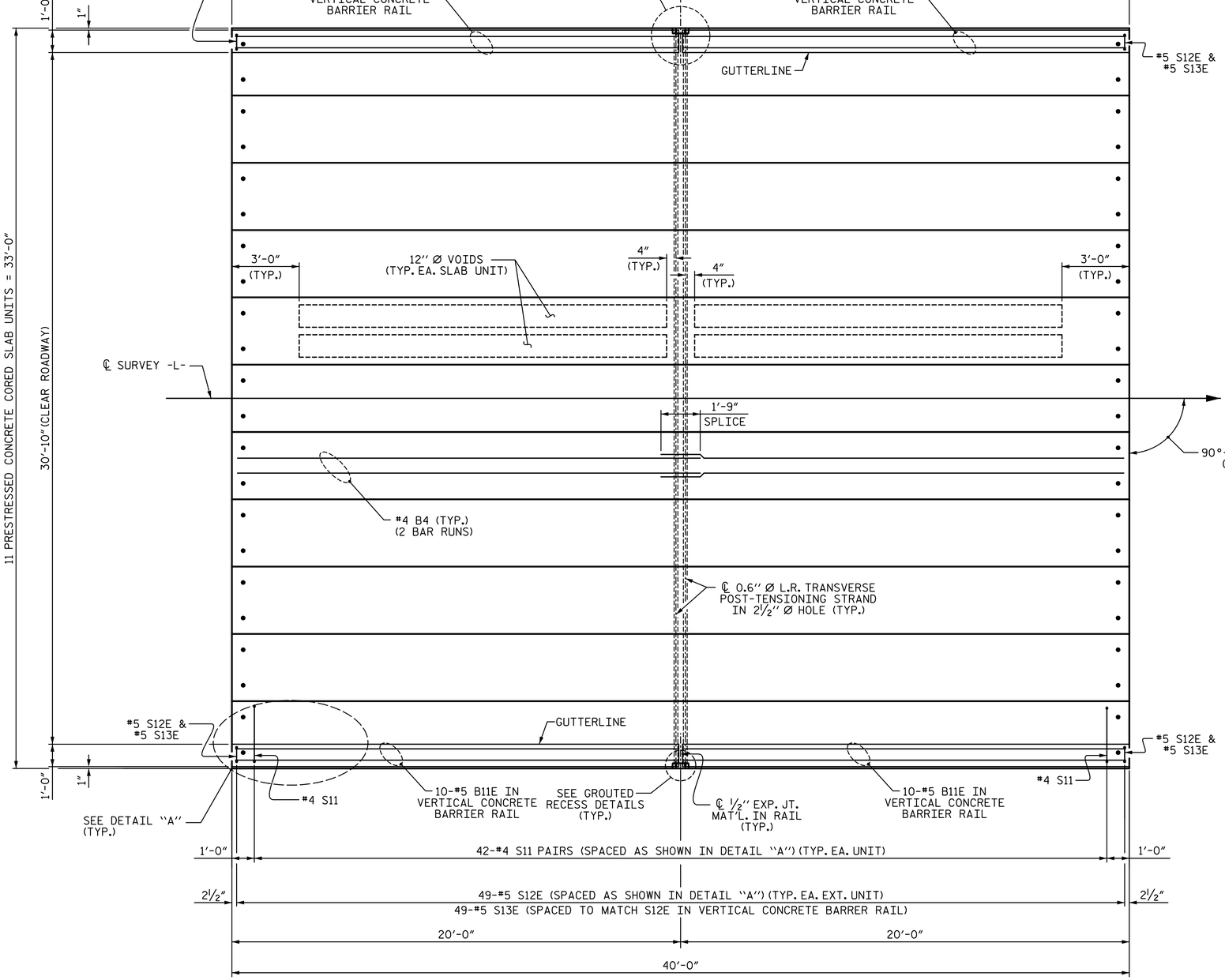
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF 70′ UNIT 30′-10″ CLEAR ROADWAY

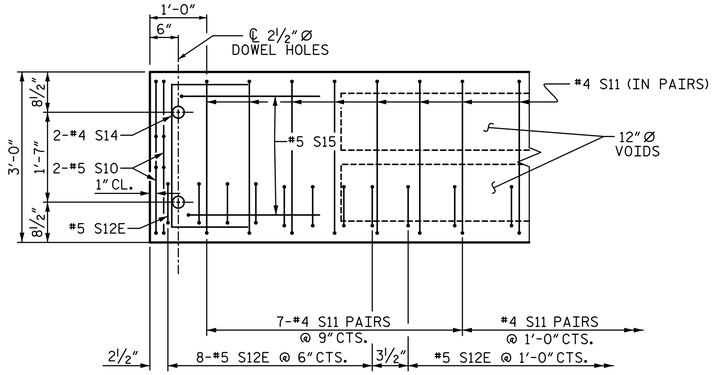
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			21

5/19/2016 9:15:39 AM G:\Projects\2014\17BP5R53 (Granville 62)\Structures\Drawings\Final\Granville 62_superstructure.dgn

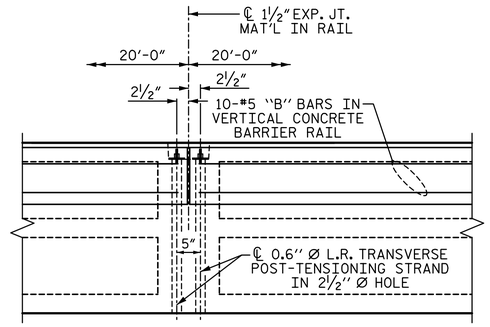


PLAN OF SPAN C UNITS



DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S12 BARS.



DETAIL "B"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2½" Ø TRANSVERSE POST-TENSIONING STRAND HOLES

PROJECT NO. 17BP.5.R.53
GRANVILLE COUNTY
STATION: 15+65.00 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF 40' UNIT 30'-10" CLEAR ROADWAY

90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			21

PLANS PREPARED BY:
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LICENSURE NO. C-2521

NORTH CAROLINA PROFESSIONAL SEAL 41268 ENGINEER BETSY S. COX
5/19/2016

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CHECKED BY: B.S. COX DATE: 5-16
DESIGN ENGINEER OF RECORD: T.J. BEACH DATE: 5-16

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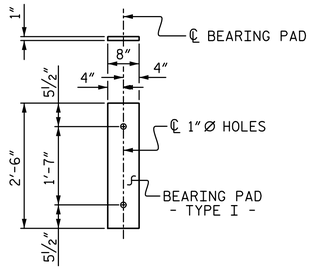
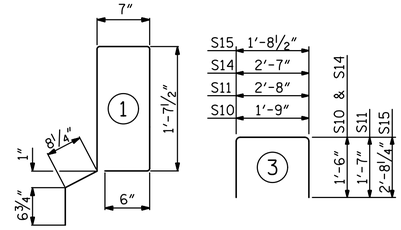


FIXED END
(TYPE I - 66 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE 25' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B1	2	#4	STR	24'-8"	33	24'-8"	33
S10	8	#5	3	4'-9"	40	4'-9"	40
S11	54	#4	3	5'-10"	210	5'-10"	210
S12E	34	#5	1	5'-7"	198		
S14	4	#4	3	5'-7"	15	5'-7"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL			LBS.		328		328
"E" EPOXY COATED REINFORCING STEEL			LBS.		198		
5000 P.S.I. CONCRETE			CU. YDS.		4.4		4.4
0.6"Ø L.R. STRANDS			No.		9		9

BILL OF MATERIAL FOR ONE 70' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B22	6	#4	STR	24'-6"	98	24'-6"	98
S10	8	#5	3	4'-9"	40	4'-9"	40
S11	144	#4	3	5'-10"	561	5'-10"	561
S12E	79	#5	1	5'-7"	460		
S14	4	#4	3	5'-7"	15	5'-7"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL			LBS.		744		744
"E" EPOXY COATED REINFORCING STEEL			LBS.		460		
7000 P.S.I. CONCRETE			CU. YDS.		11.8		11.8
0.6"Ø L.R. STRANDS			No.		28		28

BILL OF MATERIAL FOR ONE 40' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B4	4	#4	STR	20'-9"	55	20'-9"	55
S10	8	#5	3	4'-9"	40	4'-9"	40
S11	84	#4	3	5'-10"	327	5'-10"	327
S12E	49	#5	1	5'-7"	285		
S14	4	#4	3	5'-7"	15	5'-7"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL			LBS.		467		467
"E" EPOXY COATED REINFORCING STEEL			LBS.		285		
6500 P.S.I. CONCRETE			CU. YDS.		6.9		6.9
0.6"Ø L.R. STRANDS			No.		11		11

"E" INDICATES EPOXY CODED REINFORCING STEEL

NOTES:

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2½"Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

ALL REINFORCING STEEL IN VERTICAL CONCRETE BARRIER RAILS SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.

MAINTAIN A SYMMETRIC TENSION FORCE BETWEEN EACH PAIR OF TRANSVERSE POST TENSIONING STRANDS IN THE DIAPHRAGM.

THE #4 S11 STIRRUPS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO THE GROUTED RECESS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

DEAD LOAD DEFLECTION AND CAMBER

	3'-0" x 2'-0"
25' CORED SLAB UNIT	0.6"Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	3/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	0" ↕
FINAL CAMBER	3/16" ↑

** INCLUDES FUTURE WEARING SURFACE

DEAD LOAD DEFLECTION AND CAMBER

	3'-0" x 2'-0"
70' CORED SLAB UNIT	0.6"Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	2¼" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	¾" ↕
FINAL CAMBER	1½" ↑

** INCLUDES FUTURE WEARING SURFACE

DEAD LOAD DEFLECTION AND CAMBER

	3'-0" x 2'-0"
40' CORED SLAB UNIT	0.6"Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	9/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/8" ↕
FINAL CAMBER	7/16" ↑

** INCLUDES FUTURE WEARING SURFACE

GRADE 270 STRANDS

	0.6"Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
25' UNIT			
EXTERIOR C.S.	2	25'-0"	50'-0"
INTERIOR C.S.	9	25'-0"	225'-0"
TOTAL	11	25'-0"	275'-0"

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
70' UNIT			
EXTERIOR C.S.	2	70'-0"	140'-0"
INTERIOR C.S.	9	70'-0"	630'-0"
TOTAL	11	70'-0"	770'-0"

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
40' UNIT			
EXTERIOR C.S.	2	40'-0"	80'-0"
INTERIOR C.S.	9	40'-0"	360'-0"
TOTAL	11	40'-0"	440'-0"

CONCRETE RELEASE STRENGTH

UNIT	PSI
25' UNITS	4000
70' UNITS	5500
40' UNITS	4000

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT

	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
25' UNITS	3 5/16"	3'-9 5/16"
70' UNITS	2"	3'-8"
40' UNITS	3 1/16"	3'-9 1/16"

PROJECT NO. 17BP.5.R.53
GRANVILLE COUNTY
STATION: 15+65.00 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
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RALEIGH
SUPERSTRUCTURE

3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLAB UNIT

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5/19/2016

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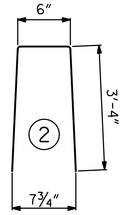
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	25′ UNIT					
B8E	20		#5	STR	24′-7″	513
S13E	68		#5	2	7′-2″	508
″E″ EPOXY COATED REINFORCING STEEL				LBS.		1021
CLASS AA CONCRETE				CU.YDS.		6.5
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		50.25

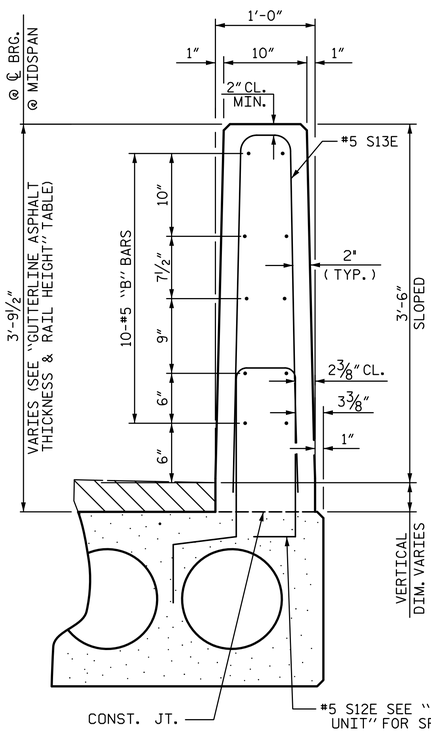
BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	70′ UNIT					
B25E	60		#5	STR	22′-11″	1434
S13E	158		#5	2	7′-2″	1181
″E″ EPOXY COATED REINFORCING STEEL				LBS.		2615
CLASS AA CONCRETE				CU.YDS.		18.1
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		140.25

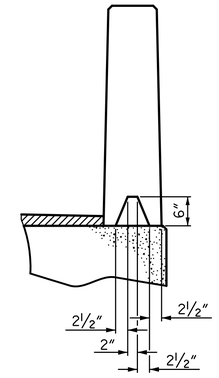
BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	40′ UNIT					
B11E	40		#5	STR	19′-7″	817
S13E	98		#5	2	7′-2″	733
″E″ EPOXY COATED REINFORCING STEEL				LBS.		1550
CLASS AA CONCRETE				CU.YDS.		10.4
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		80.25

″E″ INDICATES EPOXY COATED REINFORCING STEEL

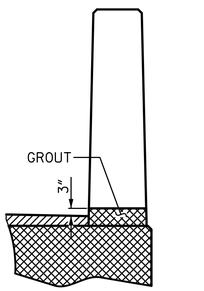


SECTION THRU RAIL



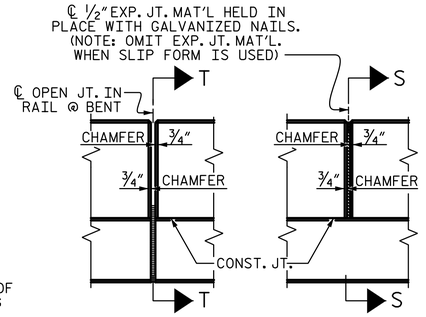
SECTION S-S

AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)

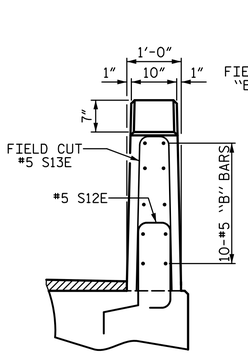


SECTION T-T

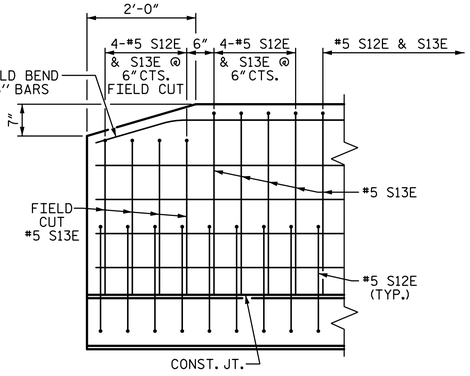
AT OPEN JOINT AT BENT
(THIS IS TO BE USED WHERE FOAM JOINT IS NOT USED)



ELEVATION AT EXPANSION JOINTS



END VIEW



SIDE VIEW

VERTICAL CONCRETE BARRIER RAIL DETAILS

END OF RAIL DETAILS

PROJECT NO. 17BP.5.R.53

GRANVILLE COUNTY

STATION: 15+65.00 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

3′-0″ X 2′-0″
PRESTRESSED CONCRETE
CORED SLAB UNIT

PLANS PREPARED BY:
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5/19/2016

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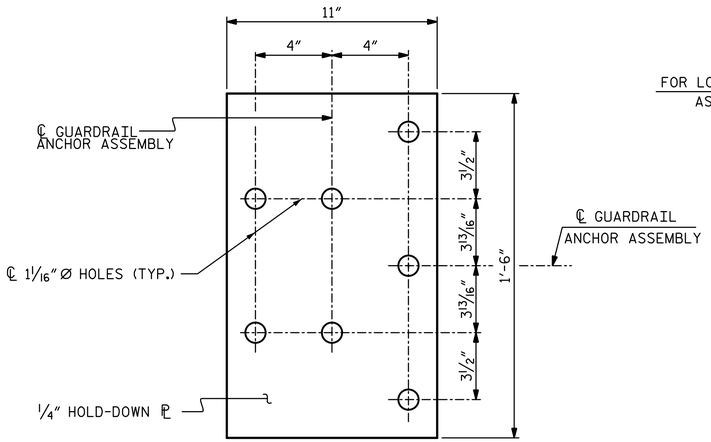
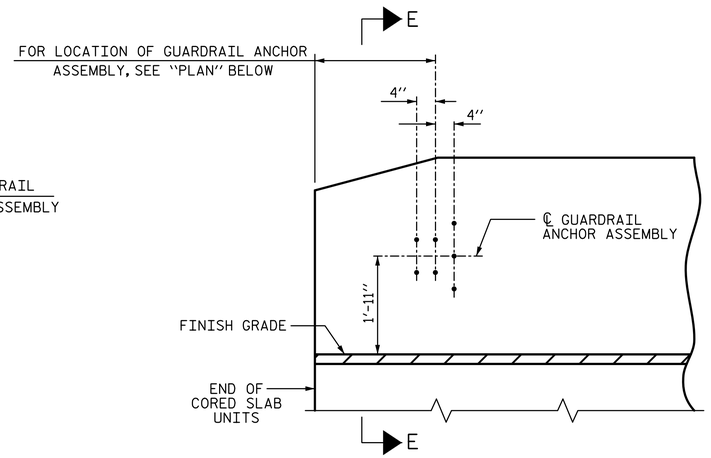


PLAN



ELEVATION

NOTES:

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4″ HOLD DOWN PLATE AND 7 - 7/8″ Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8″ Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

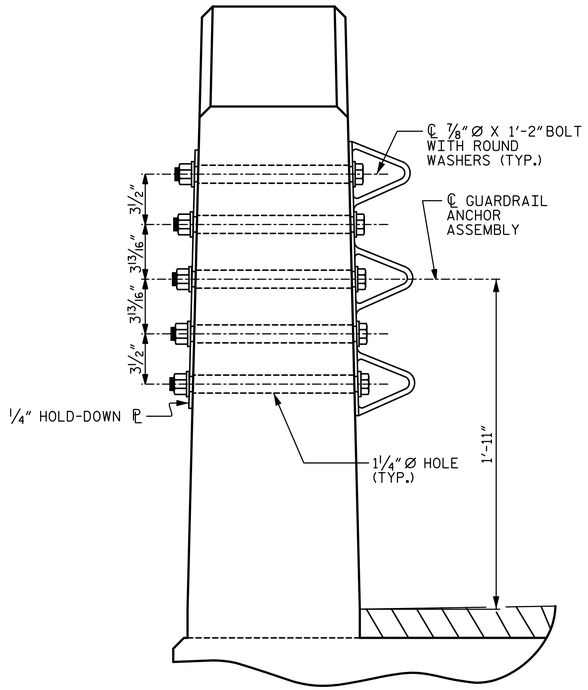
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

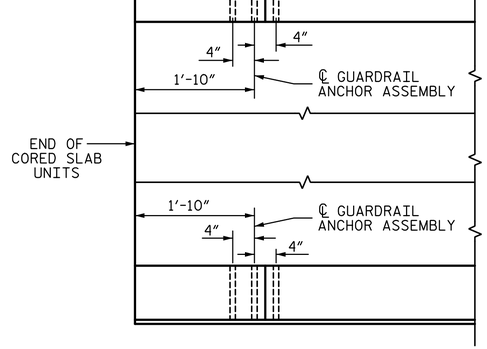
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

THE 1 1/4″ Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

(END BENT 1 SHOWN, END BENT 2 SIMILAR.)

SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. 17BP.5.R.53

GRANVILLE COUNTY

STATION: 15+65.00 -L-

STATE OF NORTH CAROLINA
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SUPERSTRUCTURE

GUARDRAIL ANCHORAGE FOR VERTICAL CONCRETE BARRIER RAIL

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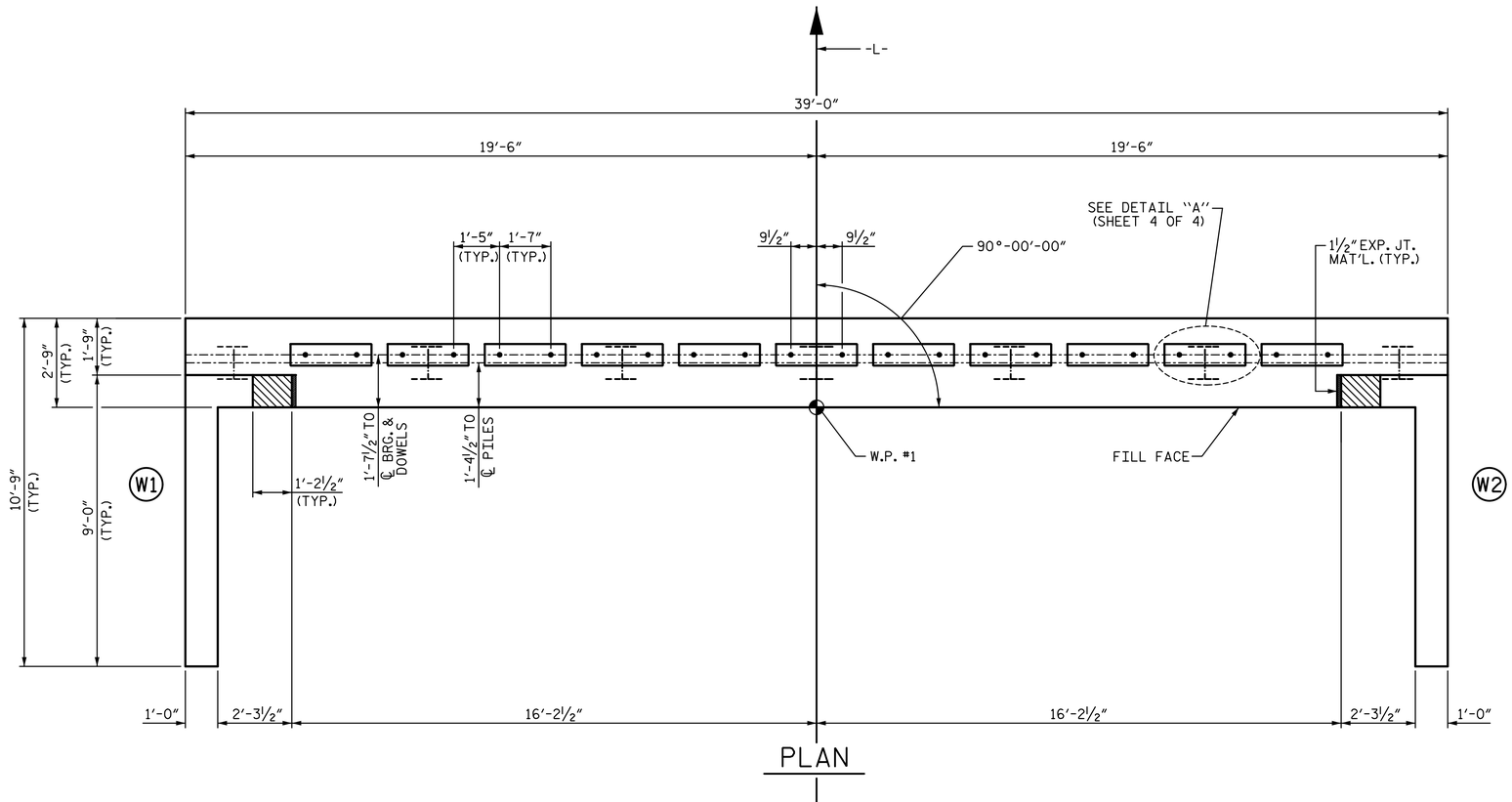
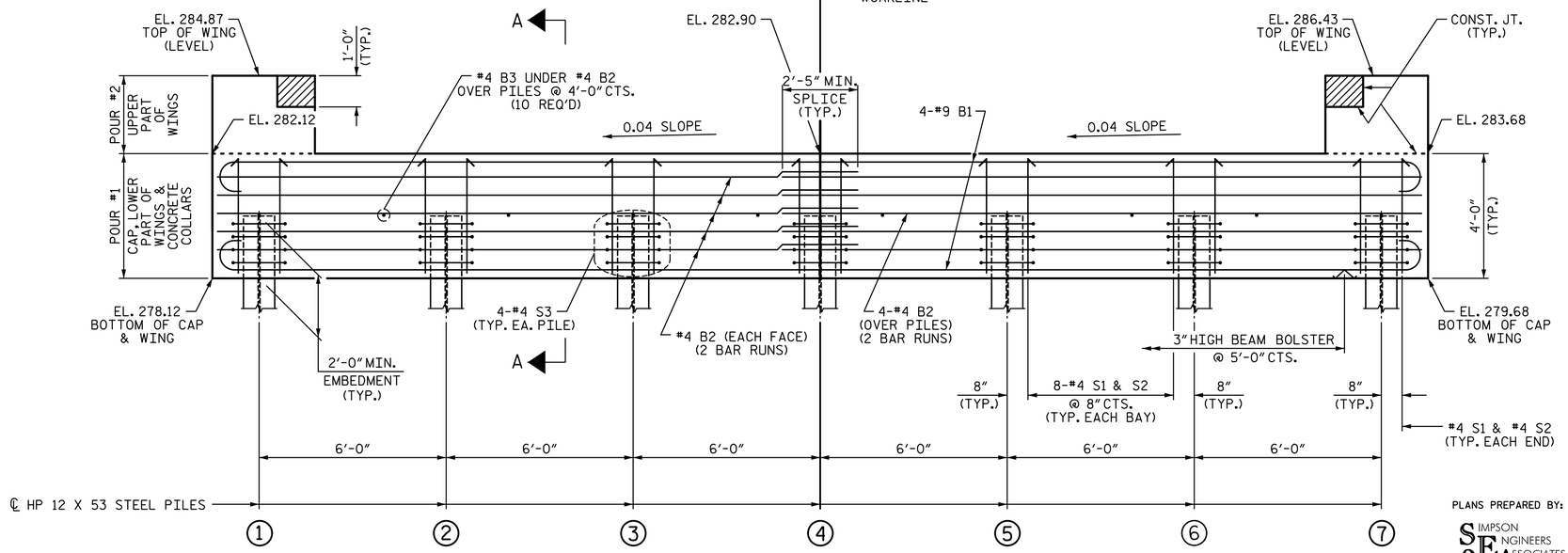


PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

NOTES:

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

INSTALL THE 4"DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

TOP OF PILE ELEVATIONS	
①	280.20
②	280.44
③	280.68
④	280.92
⑤	281.16
⑥	281.40
⑦	281.64

PROJECT NO. 17BP.5.R.53
GRANVILLE COUNTY
STATION: 15+65.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

END BENT 1

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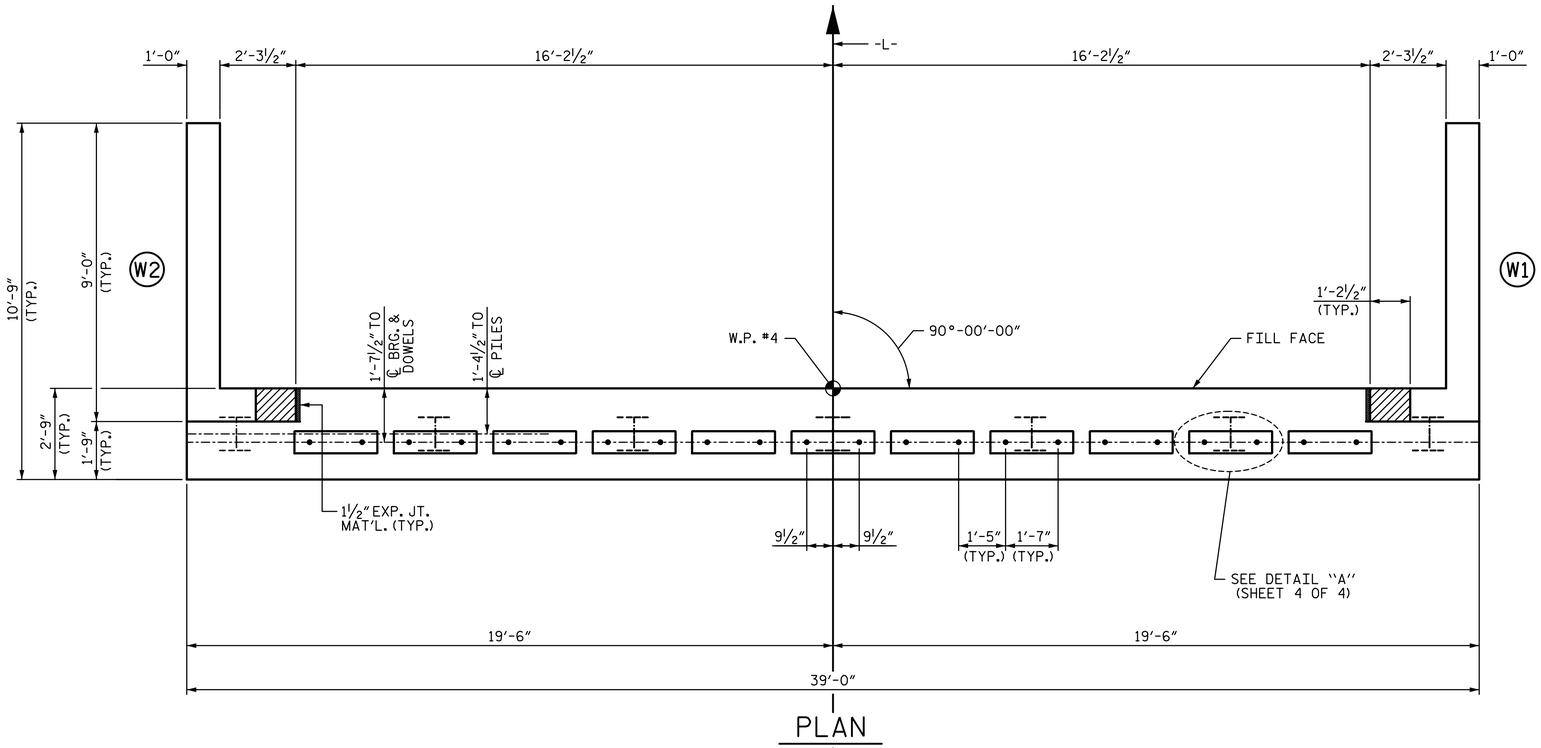
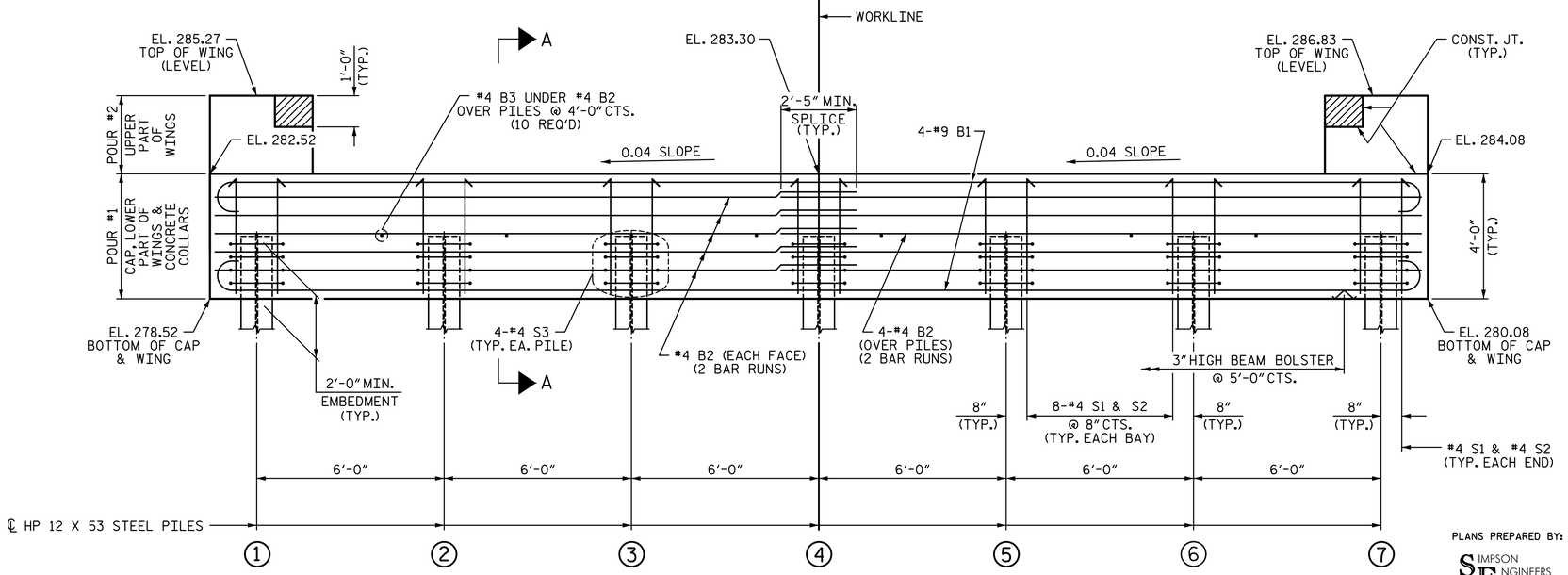


PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

NOTES:

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

INSTALL THE 4" DIAMETER. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

TOP OF PILE ELEVATIONS	
①	280.60
②	280.84
③	281.08
④	281.32
⑤	281.56
⑥	281.80
⑦	282.04

PROJECT NO. 17BP.5.R.53
GRANVILLE COUNTY
STATION: 15+65.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

END BENT 2

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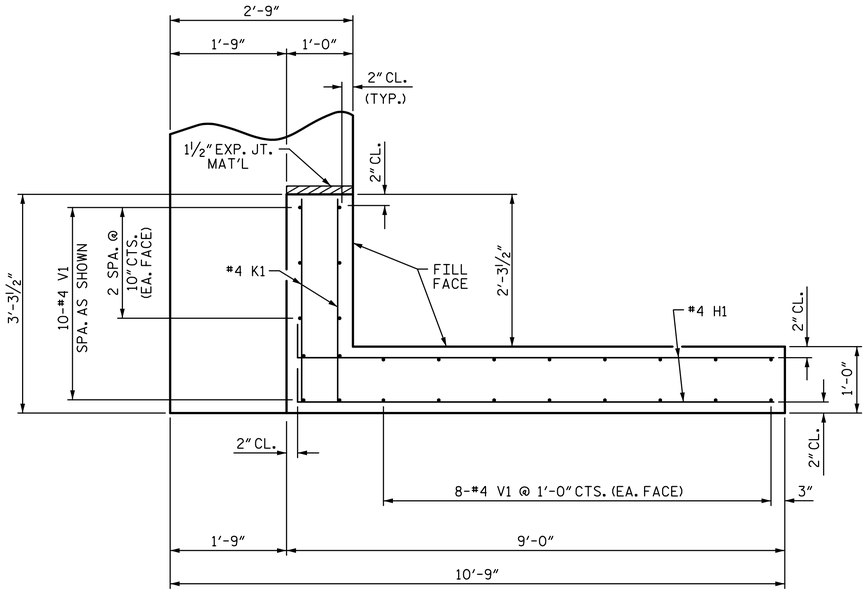
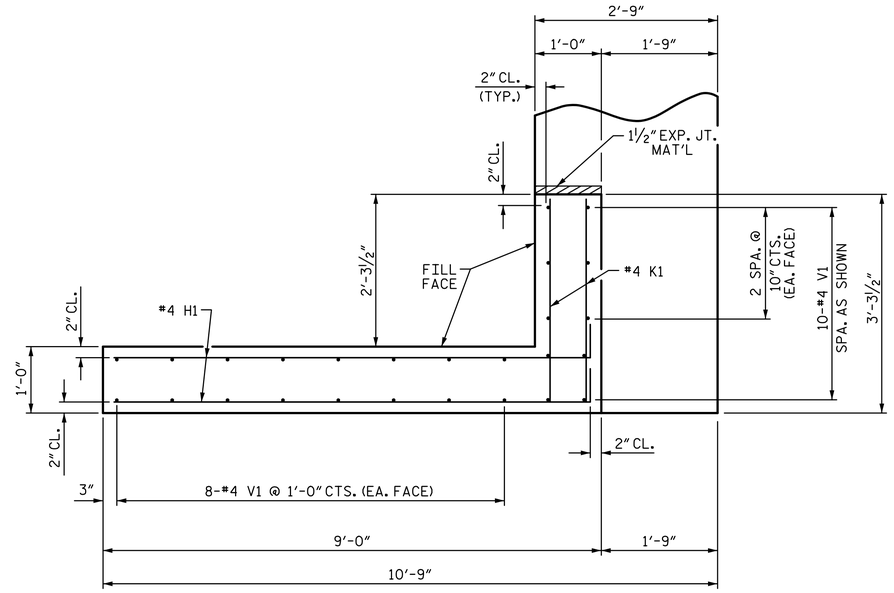
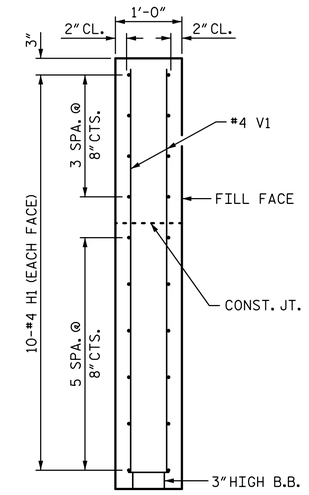


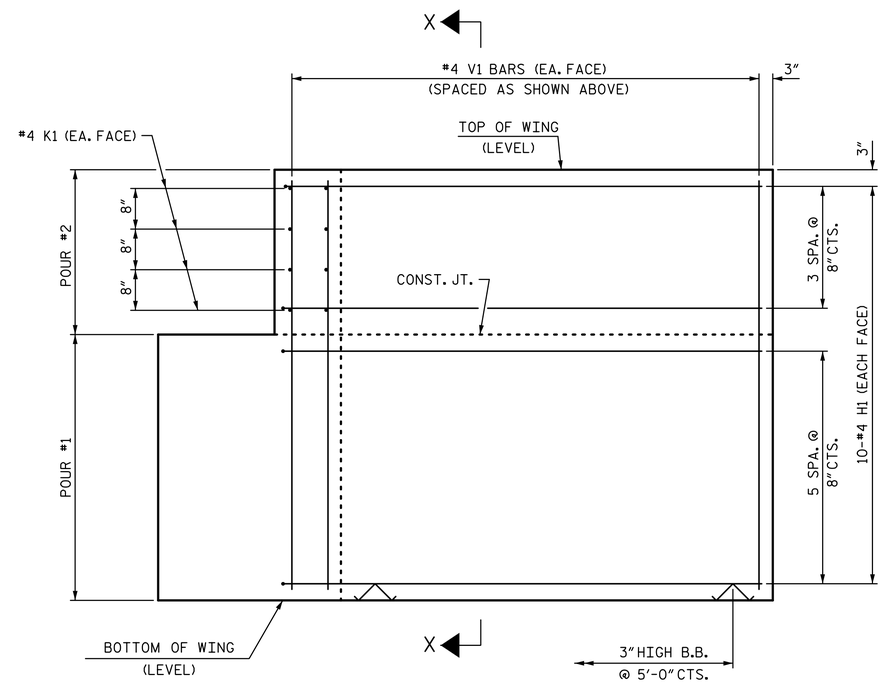
PLAN OF WING (W1)



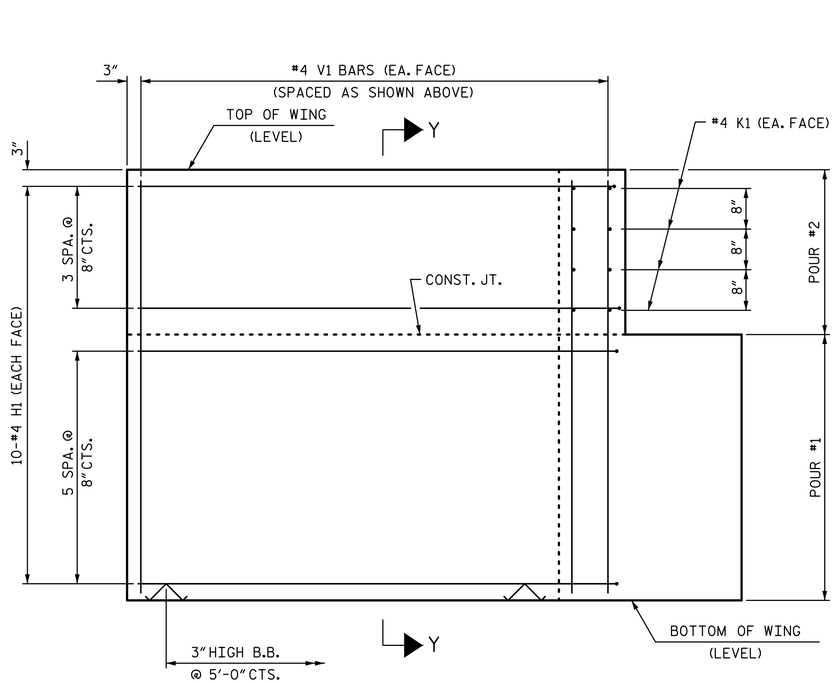
PLAN OF WING (W2)



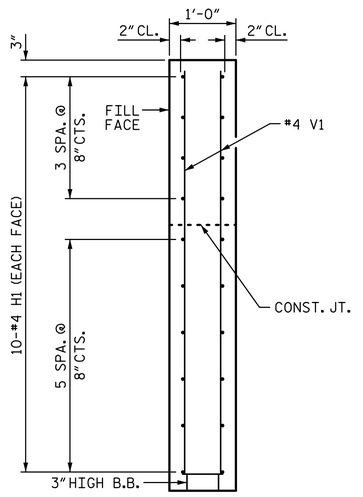
SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION Y-Y

PROJECT NO. 17BP.5.R.53

GRANVILLE COUNTY

STATION: 15+65.00 -L-

SHEET 3 OF 4

PLANS PREPARED BY:
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LICENSURE NO. C-2521

NORTH CAROLINA PROFESSIONAL SEAL L1268 ENGINEER BETSY S. COX
5/19/2016

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT WING DETAILS

DRAWN BY:	S.D. COOPER	DATE:	5-16
CHECKED BY:	B.S. COX	DATE:	5-16
DESIGN ENGINEER OF RECORD:	T.J. BEACH	DATE:	5-16

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			21

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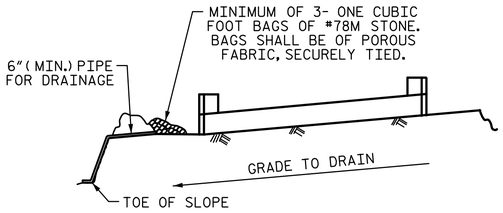
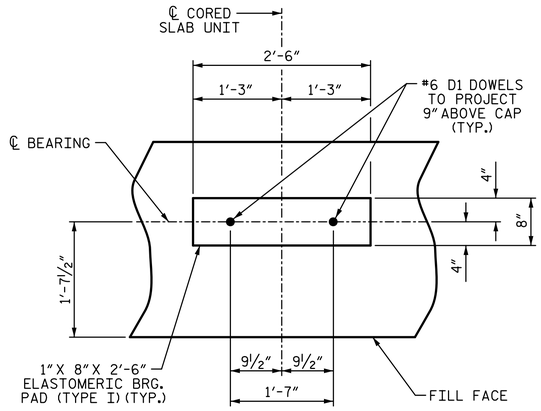


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. MINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

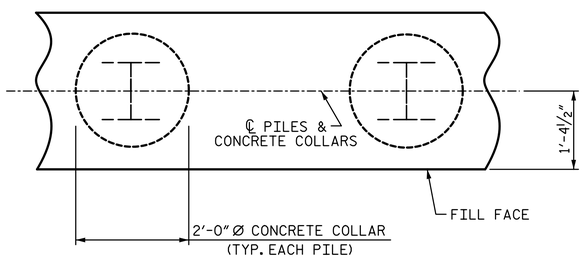
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

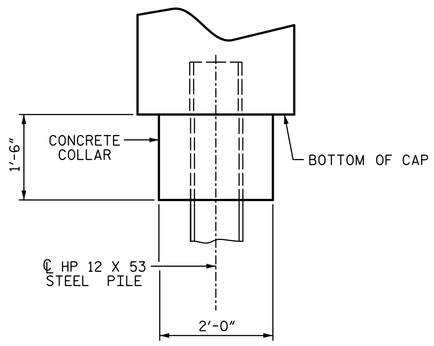


DETAIL "A"

(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)



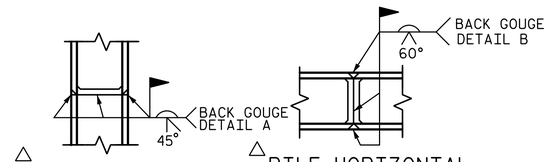
PLAN



ELEVATION

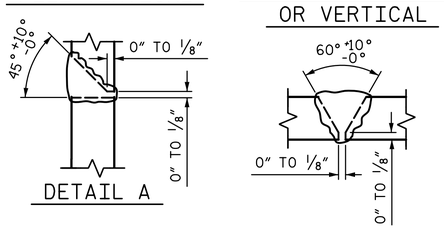
CORROSION PROTECTION FOR STEEL PILES DETAIL

(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)



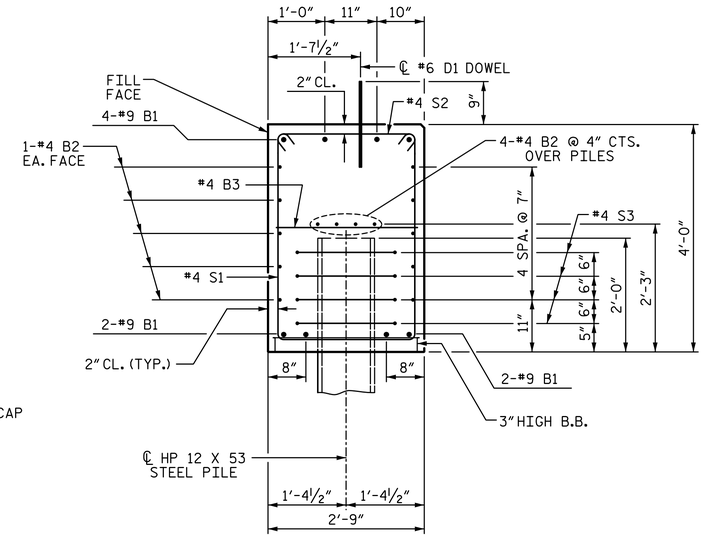
△ PILE VERTICAL

△ PILE HORIZONTAL OR VERTICAL



△ POSITION OF PILE DURING WELDING.

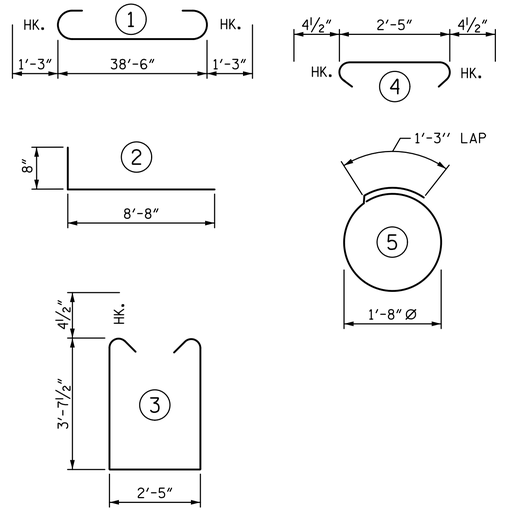
PILE SPLICE DETAILS



SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT 1	END BENT 2
HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES
NO: 7 LIN. FT. = 105	NO: 7 LIN. FT. = 105
STEEL PILE POINTS NO. = 7	STEEL PILE POINTS NO. = 7

BILL OF MATERIAL

FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	41'-0"	1115
B2	28	#4	STR	20'-7"	385
B3	10	#4	STR	2'-5"	16
D1	22	#6	STR	1'-6"	50
H1	40	#4	2	9'-4"	249
K1	16	#4	STR	2'-11"	31
S1	50	#4	3	10'-5"	348
S2	50	#4	4	3'-2"	106
S3	28	#4	5	6'-6"	122
V1	52	#4	STR	6'-4"	220

REINFORCING STEEL (FOR ONE END BENT) 2642 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1 CAP, LOWER PART OF WINGS & COLLARS 19.5 C.Y.

POUR #2 UPPER PART OF WINGS 2.3 C.Y.

TOTAL CLASS A CONCRETE 21.8 C.Y.

PROJECT NO. 17BP.5.R.53

GRANVILLE COUNTY

STATION: 15+65.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 & 2 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			21

DRAWN BY: S.D. COOPER DATE: 5-16
CHECKED BY: B.S. COX DATE: 5-16
DESIGN ENGINEER OF RECORD: T.J. BEACH DATE: 5-16

PLANS PREPARED BY:

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5/19/2016

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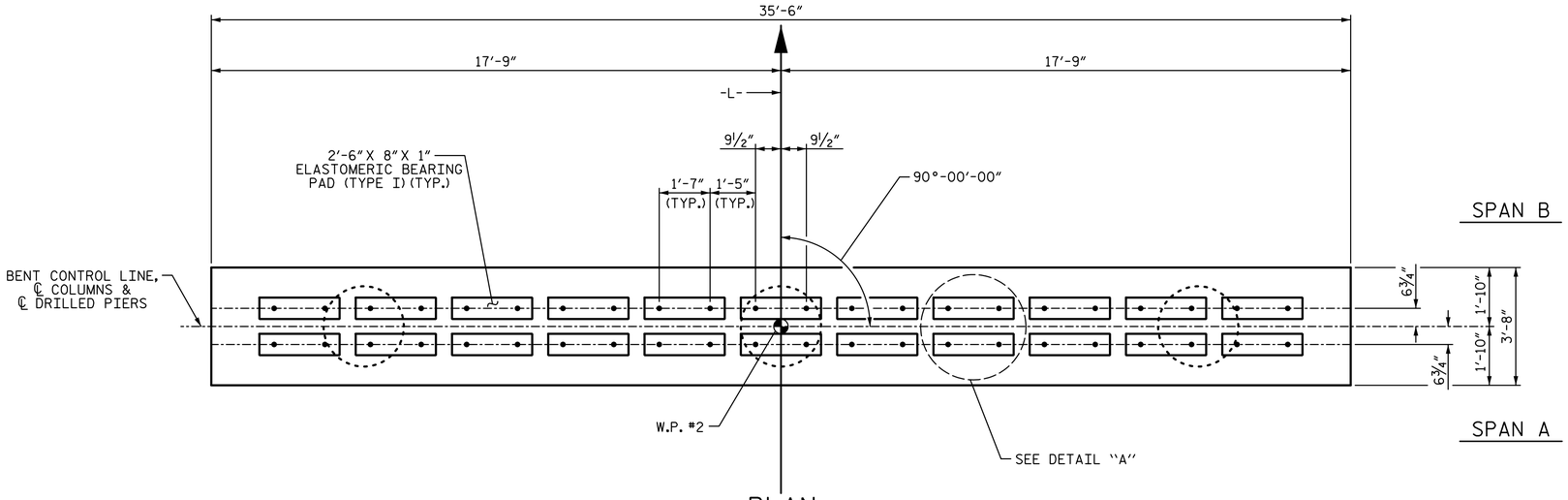
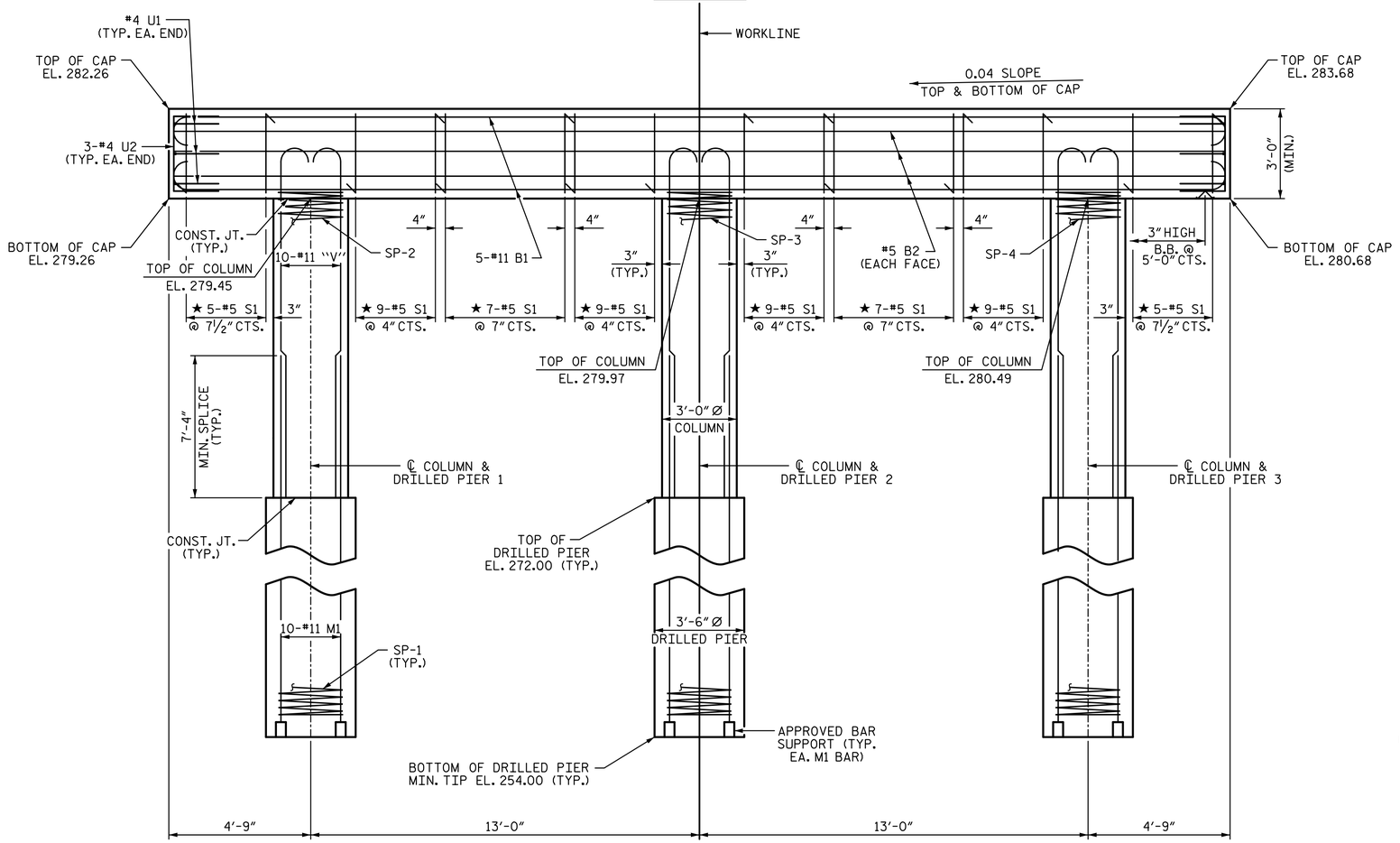


PLAN



ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.

NOTES:

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

HOOKS ON ″V″ BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

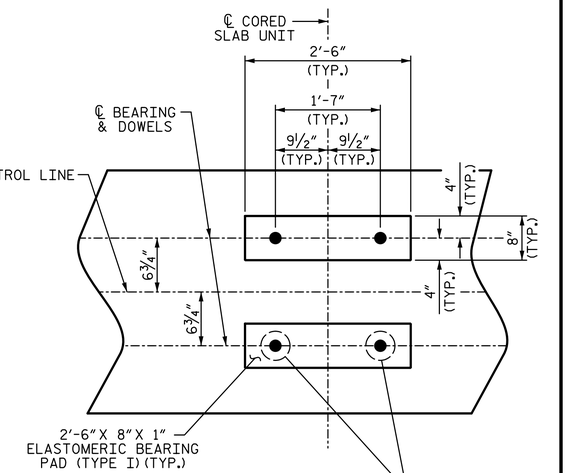
FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR ″REINFORCING STEEL″ AND ″SPIRAL COLUMN REINFORCING STEEL.″

★ INVERT ALTERNATE STIRRUPS.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.

THE CONTRACTOR′S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.



DETAIL ″A″

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. 17BP.5.R.53

GRANVILLE COUNTY

STATION: 15+65.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			21

DRAWN BY: S.D. COOPER DATE: 5-16
CHECKED BY: B.S. COX DATE: 5-16
DESIGN ENGINEER OF RECORD: T.J. BEACH DATE: 5-16

PLANS PREPARED BY:
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5/19/2016

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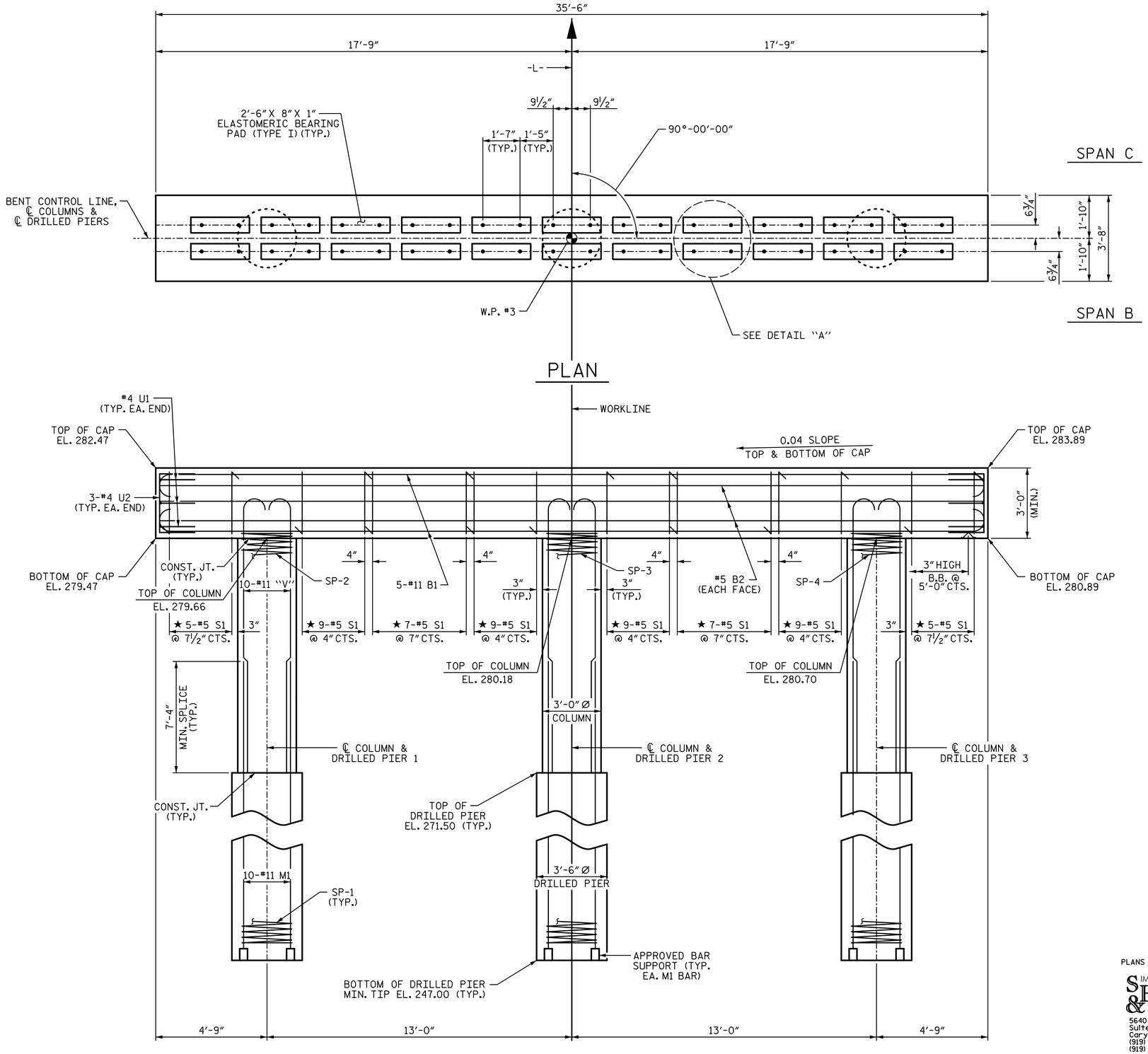


ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.

NOTES:

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

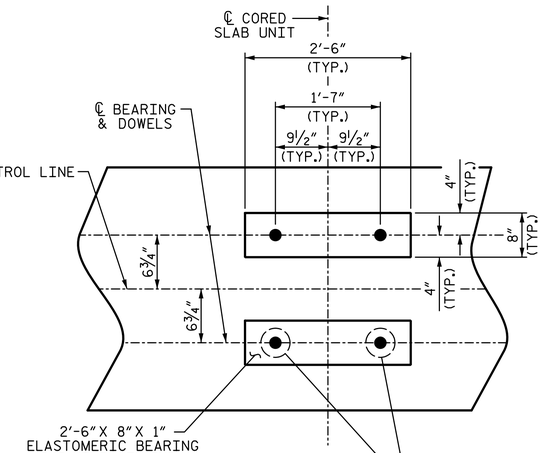
FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

★ INVERT ALTERNATE STIRRUPS.

DRILLED PIERS SHALL BE TERMINATED ONE FOOT ± ABOVE NORMAL WATER SURFACE ELEVATION FOR SHAFTS LOCATED IN WATER.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. 17BP.5.R.53

GRANVILLE COUNTY

STATION: 15+65.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			21

DRAWN BY: S.D. COOPER DATE: 5-16
CHECKED BY: B.S. COX DATE: 5-16
DESIGN ENGINEER OF RECORD: T.J. BEACH DATE: 5-16

PLANS PREPARED BY:
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5/19/2016

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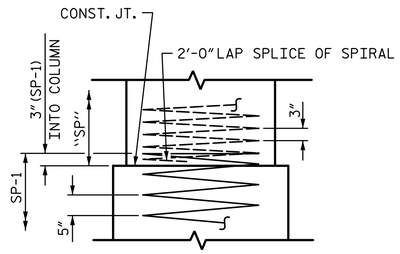
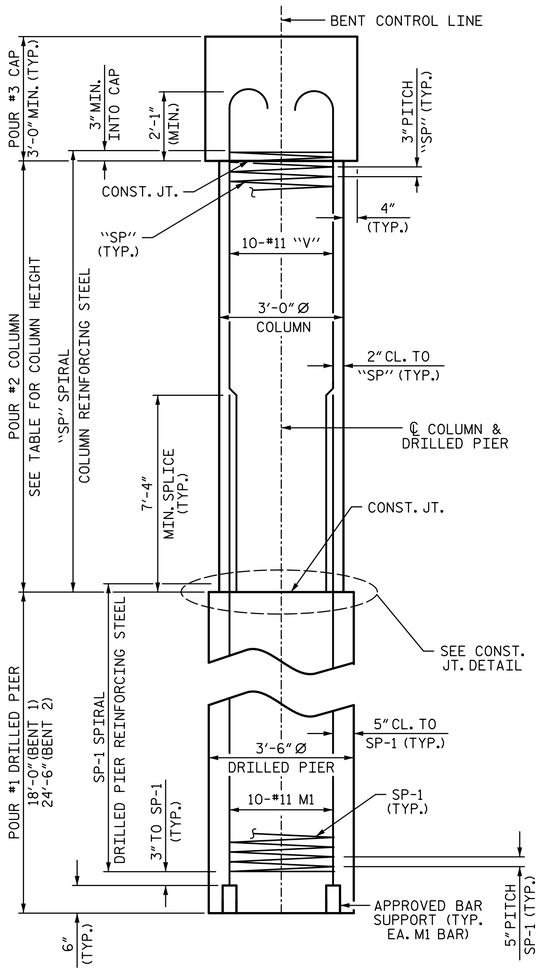
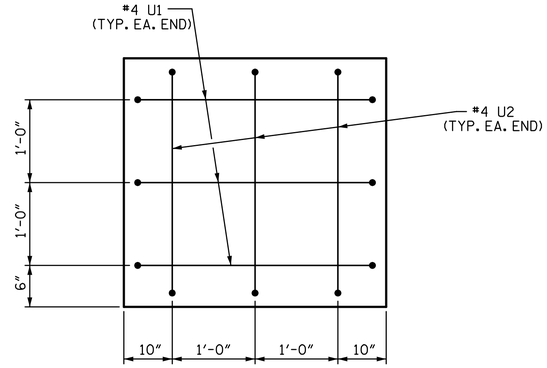


CONSTRUCTION JOINT DETAIL

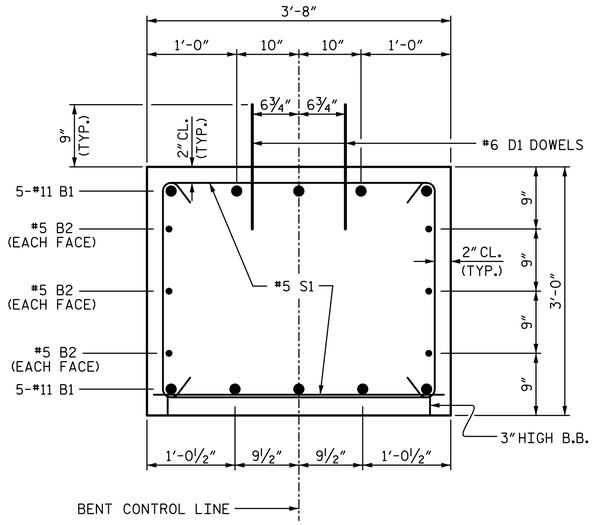


END ELEVATION

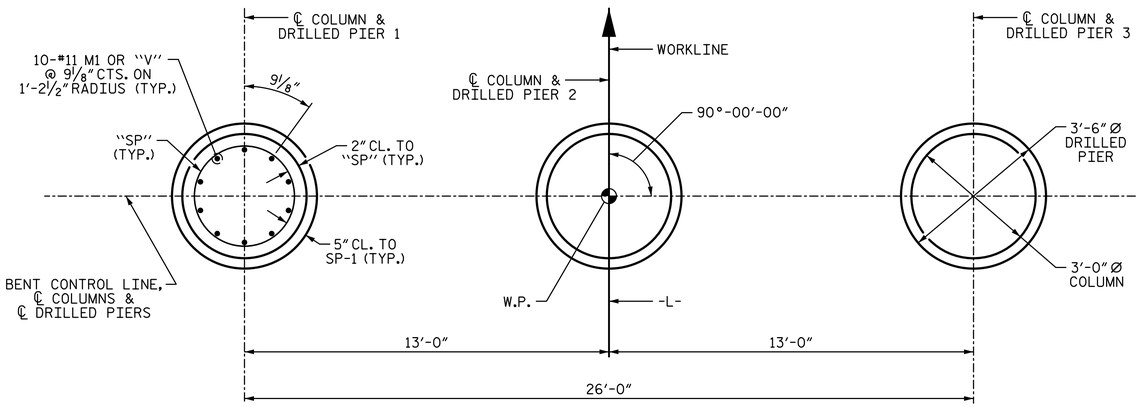


END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION THRU CAP



PLAN OF DRILLED PIERS & COLUMNS

COLUMN HEIGHT

	COLUMN #1	COLUMN #2	COLUMN #3
BENT 1	7'-5⅜"	7'-11⅝"	8'-5⅞"
BENT 2	8'-1 15/16"	8'-8 3/16"	9'-2⅜"

DRAWN BY: S.D. COOPER DATE: 5-16
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NORTH CAROLINA PROFESSIONAL SEAL 41268 ENGINEER BETSY S. COX
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PROJECT NO. 17BP.5.R.53
GRANVILLE COUNTY
STATION: 15+65.00 -L-
SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

BENT DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			21

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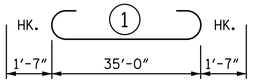
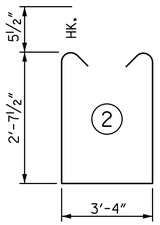
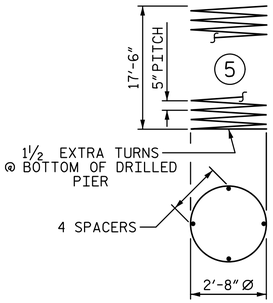
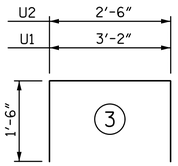
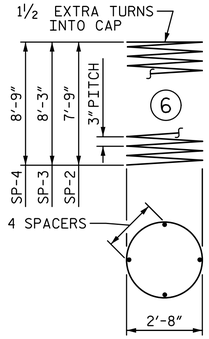
BAR TYPES

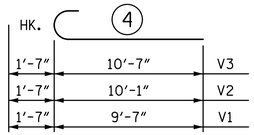












ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT 1

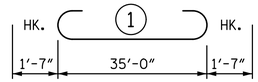
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	11	1	38'-2"	2028
B2	6	5	STR	35'-2"	220
D1	44	6	STR	1'-6"	99
M1	30	11	STR	27'-10"	4436
S1	60	5	2	9'-6"	595
U1	6	4	3	6'-2"	25
U2	6	4	3	5'-6"	22
V1	10	11	4	11'-2"	593
V2	10	11	4	11'-8"	620
V3	10	11	4	12'-2"	646
SP-1	3	*	5	361'-11"	1132
SP-2	1	**	6	272'-4"	182
SP-3	1	**	6	288'-10"	193
SP-4	1	**	6	305'-4"	204

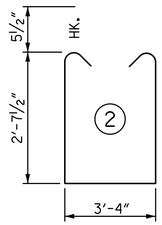
REINFORCING STEEL	9284	LB
SPIRAL COL. REINF. STEEL	1711	LB
CLASS "A" CONCRETE BREAKDOWN		
POUR 2 (COLUMNS)	6.3	CY
POUR 3 (CAP)	14.5	CY
TOTAL	20.8	CY
DRILLED PIERS:		
DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)	19.2	CY
3'-6" Ø DRILLED PIERS	54.0	LF
PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER	21.0	LF
CSL TUBES	234.0	LF

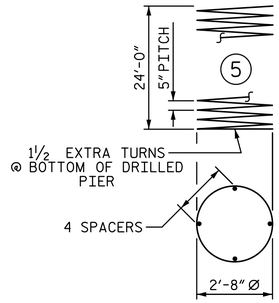
* THE "SP-1" SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

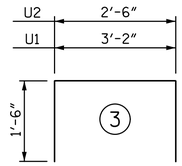
** THE "SP-2", "SP-3" AND "SP-4" SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

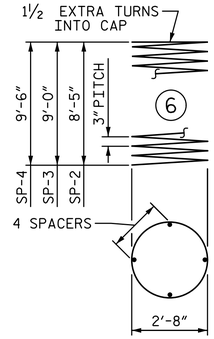
BAR TYPES

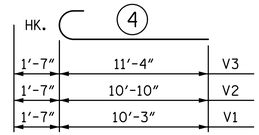












ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	11	1	38'-2"	2028
B2	6	5	STR	35'-2"	220
D1	44	6	STR	1'-6"	99
M1	30	11	STR	34'-4"	5472
S1	60	5	2	9'-6"	595
U1	6	4	3	6'-2"	25
U2	6	4	3	5'-6"	22
V1	10	11	4	11'-10"	629
V2	10	11	4	12'-5"	660
V3	10	11	4	12'-11"	686
SP-1	3	*	5	493'-6"	1544
SP-2	1	**	6	297'-1"	198
SP-3	1	**	6	313'-7"	209
SP-4	1	**	6	330'-1"	220

REINFORCING STEEL	10436	LB
SPIRAL COL. REINF. STEEL	2171	LB
CLASS "A" CONCRETE BREAKDOWN		
POUR 2 (COLUMNS)	6.8	CY
POUR 3 (CAP)	14.5	CY
TOTAL	21.3	CY
DRILLED PIERS:		
DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)	26.2	CY
3'-6" Ø DRILLED PIERS	73.5	LF
PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER	28.5	LF
CSL TUBES	312.0	LF

* THE "SP-1" SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

** THE "SP-2", "SP-3" AND "SP-4" SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. 17BP.5.R.53

GRANVILLE COUNTY

STATION: 15+65.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 1 & 2 BILL OF MATERIAL

PLANS PREPARED BY:
SIMPSON ENGINEERS & ASSOCIATES
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www.simpsonengr.com
LICENSURE NO. C-2521

NORTH CAROLINA PROFESSIONAL SEAL 41268 ENGINEER BETSY S. COX
5/19/2016

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REVISIONS					
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1			3		
2			4		

SHEET NO. S-18

TOTAL SHEETS 21

DRAWN BY: S.D. COOPER DATE: 5-16
CHECKED BY: B.S. COX DATE: 5-16
DESIGN ENGINEER OF RECORD: T.J. BEACH DATE: 5-16

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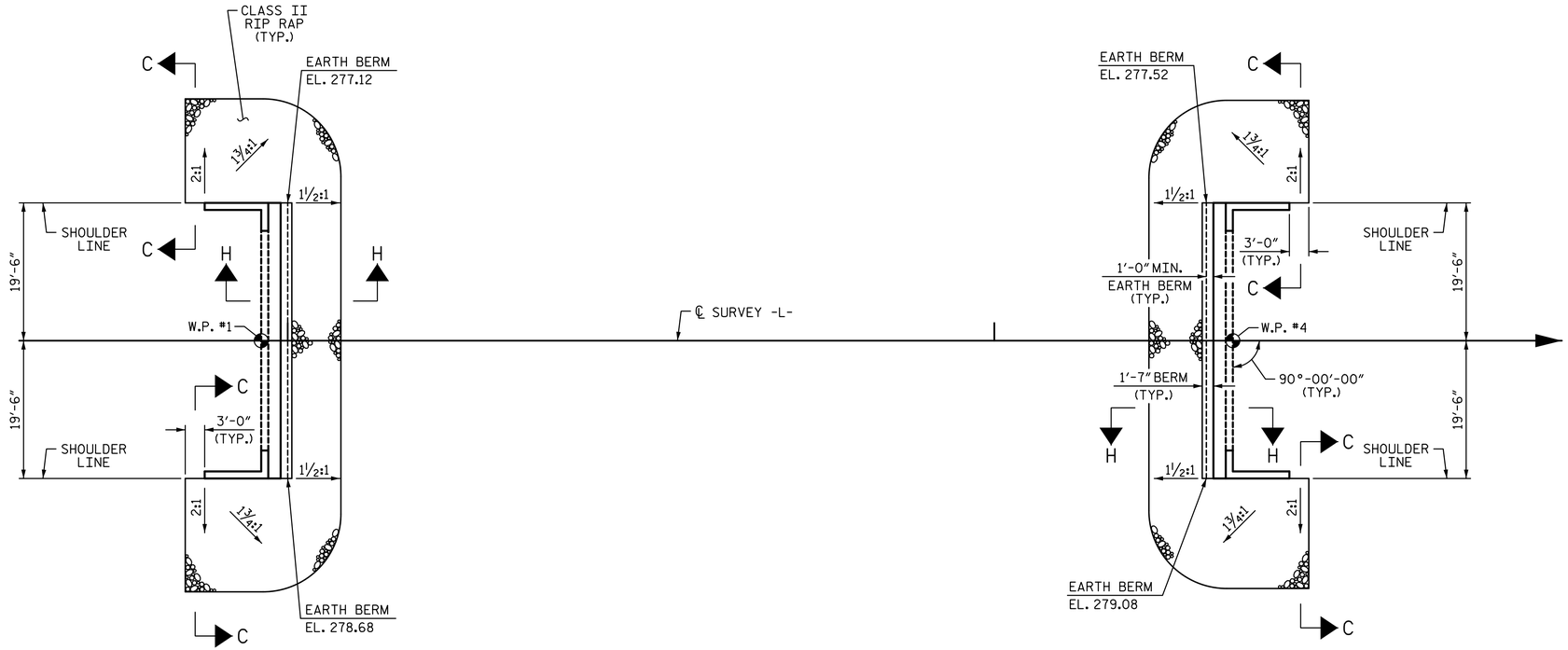
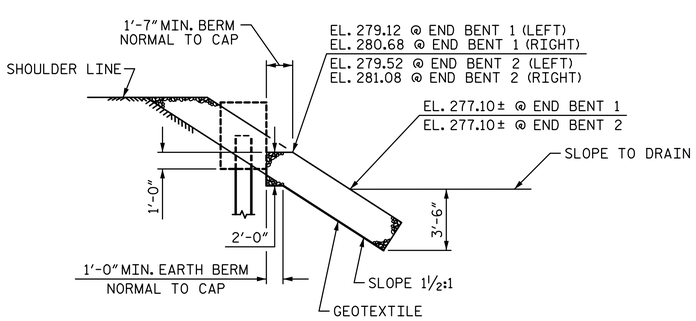


@ END BENT 1

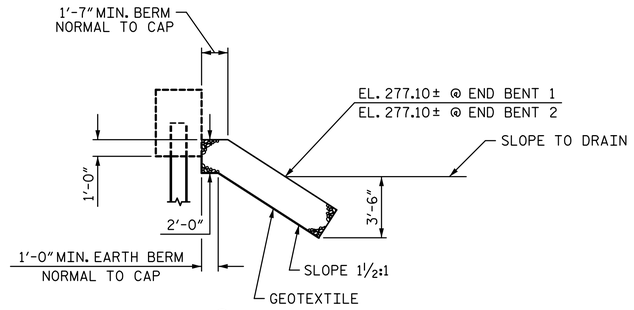
@ END BENT 2

PLAN OF RIP RAP

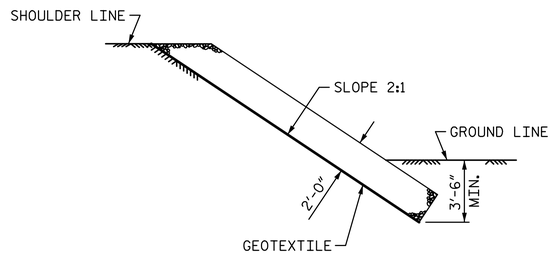
ESTIMATED QUANTITIES		
BRIDGE @ STA. 15+65.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	115	130
END BENT 2	120	135



SECTION H-H



℄ SECTION
BERM RIP RAPPED



SECTION C-C

PROJECT NO. 17BP.5.R.53

GRANVILLE COUNTY

STATION: 15+65.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

PLANS PREPARED BY:

SIMPSON ENGINEERS & ASSOCIATES
5640 Dillard Drive
Suite 200
Cary, NC 27518
(919) 852-0468
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5/19/2016

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2			4		

SHEET NO. S-19

TOTAL SHEETS 21

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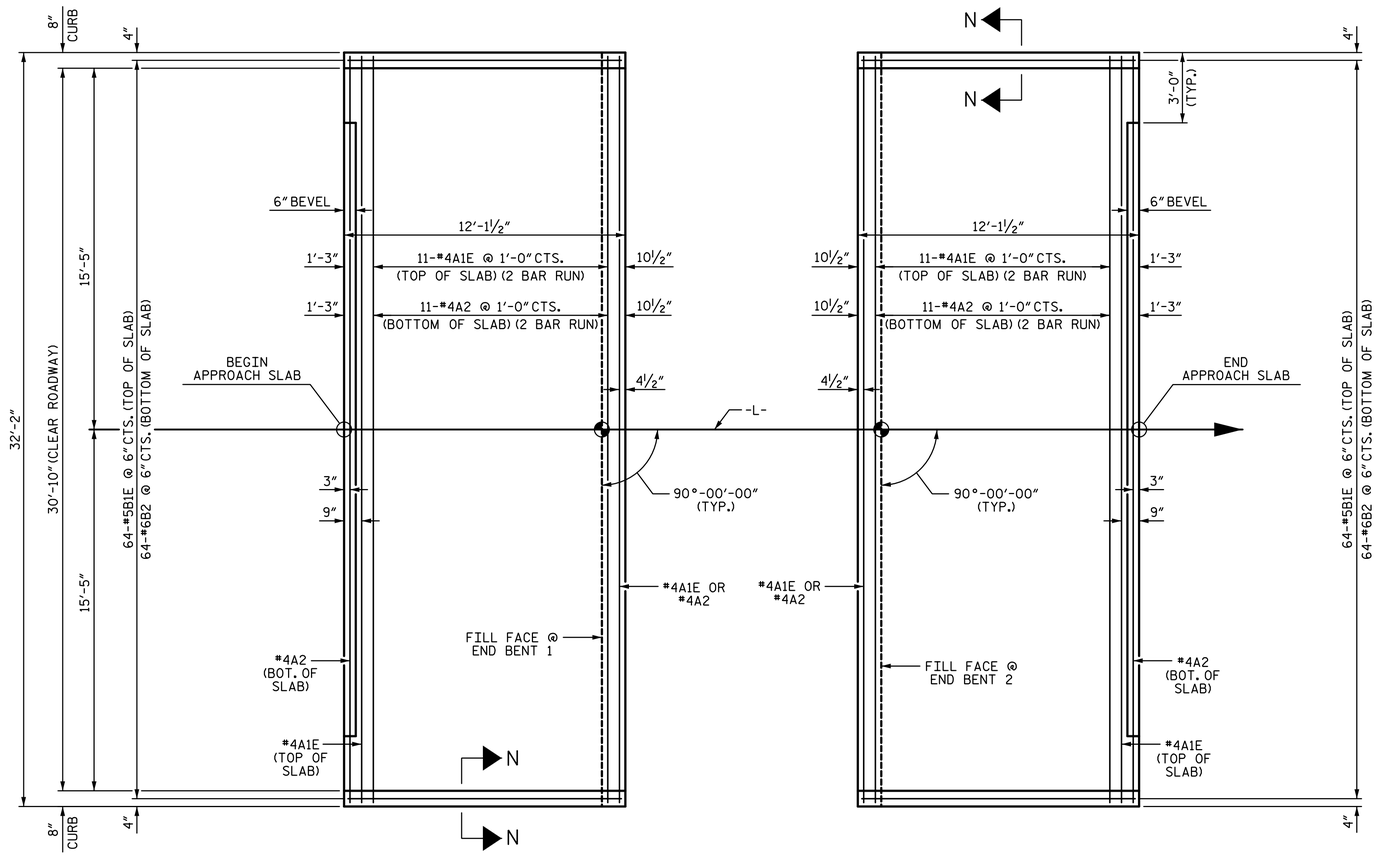
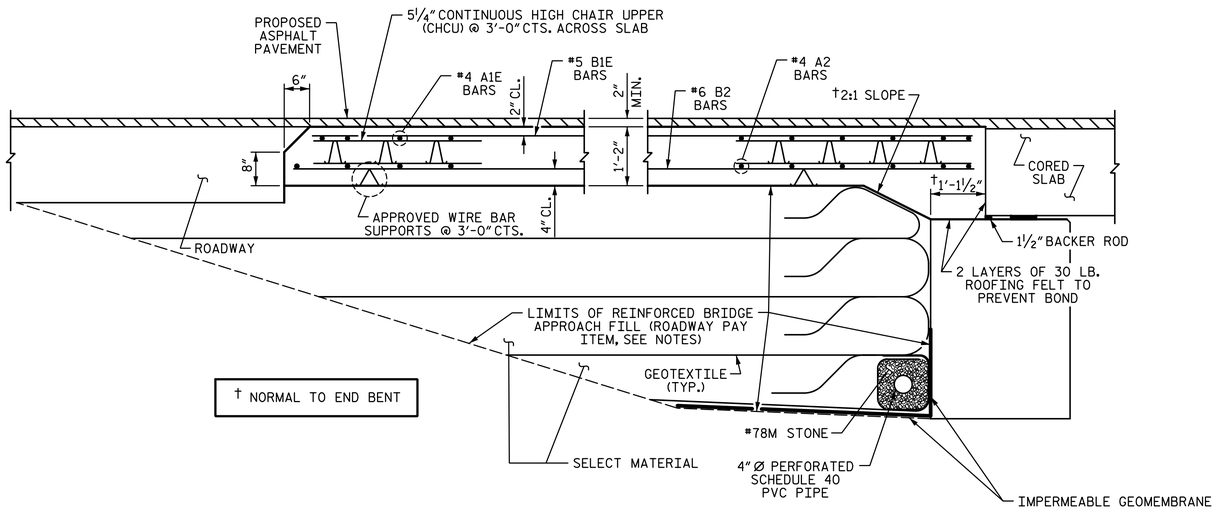


PLAN @ END BENT 1

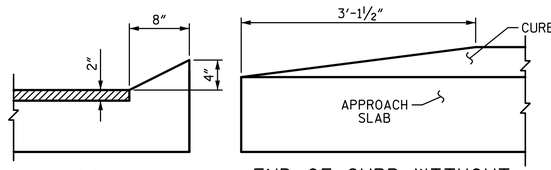
PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



† NORMAL TO END BENT

SECTION THRU SLAB



CURB DETAILS

NOTES:

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.

BILL OF MATERIAL

APPROACH SLAB AT EB 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1E	26	#4	STR	16'-11"	294
A2	26	#4	STR	16'-9"	291
B1E	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LB	1412
EPOXY COATED REINFORCING STEEL				LB	1039
CLASS AA CONCRETE				CY	19.6

APPROACH SLAB AT EB 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1E	26	#4	STR	16'-11"	294
A2	26	#4	STR	16'-9"	291
B1E	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LB	1412
EPOXY COATED REINFORCING STEEL				LB	1039
CLASS AA CONCRETE				CY	19.6

"E" INDICATES EPOXY COATED REINFORCING STEEL

SPLICE LENGTHS

BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"

PROJECT NO. 17BP.5.R.53

GRANVILLE COUNTY

STATION: 15+65.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			21

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5/19/2016

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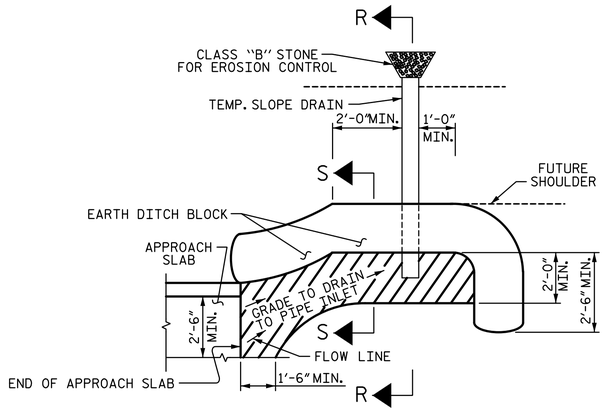
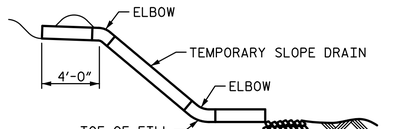
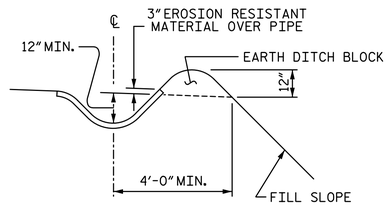


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

PLAN VIEW



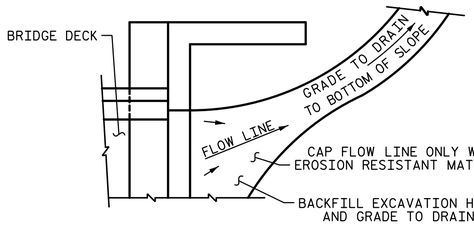
SECTION R-R



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL

PROJECT NO. 17BP.5.R.53

GRANVILLE COUNTY

STATION: 15+65.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			21

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STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF	
STRUCTURAL STEEL - AASHTO M270 GRADE 36	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION	
GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR	
UNTREATED - EXTREME FIBER STRESS	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT: ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

ENGLISH

JANUARY, 1990